



BILASPUR UNIVERSITY, BILASPUR (C.G.) QUESTION BANK



Department of Computer Science and Application (5 Year Integrated UG/PG Program) (Volume-1)



PREFACE

Bilaspur University was established in 2012, under the guidance of founder Vice-Chancellor, Honorable Prof. G.D. Sharma. The University is having more than 168 affiliated colleges with more than 2 lac students. In 2013, five university teaching departments were established namely Computer Science and application, Commerce and financial studies, Food Processing and technology, Hotel Management and hospitality and Microbiology and Bioinformatics. Bilaspur University is the first university in the state to offer CBCS system in semester programme. University is also offering one year PG diploma programme in Yoga sciences, one year PG diploma programme in computational biology and several certificate programs in collaboration with Tata Institute of Social Sciences along with Ph. D. program.

The courses offered are five years integrated PG courses in Commerce and financial studies, Computer science and application and Food Processing and Technology, 3 years graduation programme in Hotel Management and hospitality and 2 years Post graduation programme in Microbiology and Bioinformatics. Ph.D in Microbiology and Computer Sciences is also offered by Bilaspur University. It is one of the largest universities of Chhattisgarh with qualified and young faculty members.

To ensure adequate acquisition of knowledge by students, assessment and evaluation procedure of any educational institute are very vital. This question bank is prepared with an intention to provide a thorough practice to the students by categorizing the complete syllabus of the paper in form of

- i) Very short answer questions (Objective/ one word/one line)
- ii) Short answer questions
- iii) Descriptive questions

This question bank would intensify the preparation of the students for better performance in semester examination. The question bank is based on the actual pattern of questions appearing in the examination to provide a good practice to students before examination. The editorial board is happy to announce the release of first volume.

I take this opportunity to express my sincere thanks and gratitude to Hon'ble Vice chancellor Prof G.D. Sharma for his invaluable guidance and inspiration to prepare this question bank. I am also indebted to all the faculty members of computer science and application department namely Prof. J. Gupta, Prof. Rashmi Gupta, Prof Shriya Sahu and HODs of university teaching departments for giving their valuable suggestions and preparing this question bank as per the guidelines. I am also thank full to all the contributors for their effort in preparing this first volume of question bank in due time.

I hope this question bank will be use full and help full for all the students of university teaching departments to prepare for their semester examination and to achieve new academic height.

(Dr. H.S. Hota)
Co-ordinator

Department of Computer Science & Application
Bilaspur University, Bilaspur (C. G.)

Five Years Integrated B.Sc./M.Sc.(Computer Science)

Scheme and Syllabus

SEMESTER: I

Course Code	Course Name	T	P /T	C	Sessional Marks	End Semester Marks	Total Marks
MCS 101	Communication Skill	4	1	5	25	75	100
MCS 102	Mathamtics-1	5	-	5	25	75	100
MCS 103	Digital logic and Switching Theory	3	2	5	25	75	100
MCS 104	Information Technology	5	-	5	25	75	100
MCS 105	Programming in C	3	2	5	25	75	100
MCS106	Programming in C Lab	-	3	3			50

MCS 101: COMMUNICATION SKILL

Unit-I Fundamental of Communication: Definition, Importance, Process, Form of Communication, Dimension of Communication, Channels of Communication, Barriers of Communication, Qualities of a good communicator.

Unit-II Verbal and Non-Verbal Communication: Audio/Visual Communication, Effective Speaking, Interpersonal Communication, Non-Verbal Communication: Kinesics, Proxemics, Paralanguage, Activity: Short Classroom presentation.

Unit-III Listening Skill and Self Assessment: Definition and Importance, Intelligent Listening, Barriers of Listening and qualities of overcoming barriers, SWOT analysis.

Unit-IV Writing Skills: Use of Grammars, brief description & detailed Illustrations, Business correspondence, Presentations, Report Writing, Projects, notice and Circulars.

Unit-V Effective Use of Communication Skills(Practical Approach) Basics of Phonetics, Presentation Skill-Do's and Dont's, Extempore, Debate, Role Plays, Interview, Group Discussion.

MCS 102: MATHEMATICS-1

UNIT-I

Logic and Propositional Calculus: Introduction, Basic Logical Operations: Conjunction, Disjunction, Negation, Conditional and Bi-conditional statements, Tautology, Contradiction, Logical Equivalence, algebra of Propositions, Argument, Predicate, Quantifiers, Law of duality

UNIT-II

Set Theory: Introduction, Universal and Empty set, cardinality of set, Power set, Cartesian Product, Subset, Venn diagram, Set operation, Inclusion and exclusion principle

UNIT-III

Relation: Introduction, Properties of Binary Relation, Equivalence Relation, Relation Matrix, Relation Graph, Composition of Relation, Partition, Partial Order Relation, Hasse diagram

Function: Introduction, Onto function, Into function, One to One function, Bijective Function, Composition of Function, Inverse of Function

UNIT-IV

Graph- Definition, Finite and Infinite Graph, Incidence and Degree, Matrix Representation: Adjacency Matrix, incidence Matrix; Digraph. Isomorphic Graph, Homeomorphic Graph, Connected, Disconnected and strongly connected graph, Sub Graph, Walk, Path, Circuit, Complement of Graph, Regular Graph, Complete Graph, Weighted Graph, Bipartite Graph, Operations on Graph: Union, Intersection and Ring Sum; Application of Graph

UNIT-V

Cut set, cut Vertex, Eccentricity, Centre, Radius and diameter of a Graph, Depth First Search, Breadth First Search, Dijkstra's Algorithm

TEXT BOOK

1. "Discrete Mathematical structures with Applications to Computer Science", JP Trembly and R. Manohar, TMH International Edition (Latest Edition)
2. "Graph theory and its application to Engineering and Computer Science", Narsing Deo, PHI (Latest Edition)
3. "Advanced Discrete Mathematics" H.K. Pathak, J.P.Chauhan, Shiksha Sahitya Prakashan

REFERENCE BOOK

1. "Discrete Mathematics", Seymour Lipshutz & Marc Lipson, TMH
2. "Discrete Mathematics and Its Applications", Kenneth. H. Rosen, TMH
3. "Discrete Mathematics with Graph Theory" Goodaire and Parmenter, EEE.

MCS 103: DIGITAL LOGIC AND SWITCHING THEORY

UNIT-I:

Number Systems & Codes: Philosophy of number systems, Decimal, Binary, Octal, Hexadecimal, Gray code, Excess-3 code, BCD code. Conversion, number system arithmetic, complements (n-1's and n's), Signed and Unsigned numbers, representation of negative numbers.

UNIT-II:

Boolean Algebra, Fundamental postulates of Boolean algebra, Logic gates: OR, AND, NOT, XOR, Universal (NOR and NAND) Gates.

Minimization of Switching Functions: Standard representation of logic function (SOP and POS), Minimization technique- K Map method, Prime implicants, don't care combinations.

UNIT-III:

COMBINATIONAL LOGIC DESIGN: Design using conventional logic gates, Adder, Subtractor, Encoder, Decoder, Multiplexer (MUX), De-Multiplexer, MUX Realization of switching functions, Code-converters (BCD-EXCESS-3), Hazards and Hazard free realizations.

UNIT-IV:

SEQUENTIAL CIRCUITS: Definition, Basic flip-flops- SR, JK, T and D, Master Slave Flip Flop, race around condition, Steps in synchronous sequential circuit design: Register, modulo-N counter, Ring counter & Shift counters.

UNIT-V

Main memory, semiconductor memory, Flash memory, cache memory, magnetic memory: hard disk, floppy disk, optical memory.

TEXTBOOKS:

1. "Computer Fundamentals Architecture and Organization", B.Ram, New Age Techno Press.
2. "Digital Design", Morris Mano, PHI, 3rd Edition, 2006.

REFERENCE BOOKS:

1. An Engineering Approach To Digital Design – Fletcher, PHI.
2. Digital Logic – Application and Design – John M. Yarbrough, Thomson
3. Fundamentals of Logic Design – Charles H. Roth, Thomson Publications, 5th Edition, 2004.
4. Digital Logic Applications and Design – John M. Yarbrough, Thomson Publications, 2006.
5. Malvino A.P, Digital Principles and Applications, Tata McGraw Hill.
6. Computer Fundamentals: Architecture and Organization

MCS 104: INFORMATION TECHNOLOGY

UNIT-I

Introduction – Basic concept of IT, concept of data and information, History of computer, generation and classification of computer, organization of computers, Input and output devices, storage devices, data and file organization.

UNIT-II

Software and its need, types of software: system software, application software, utility software, firmware. Operating system :Types, job and objective. Language translator. Introduction and evolution of programming language , Types of programming language, Generation of programming languages, programming paradigms: procedural oriented and object oriented programming

UNIT-III:

Communication and network technology: Communication process, Communication and system elements, Analog and digital signal, mode of communication, communication media : wired and wireless; computer network: types. Criteria, advantages and disadvantages, Topology, OSI reference model and TCP/IP model

UNIT-IV

Internet: Technical foundation of internet , history of internet, Internet service provider(ISP), ARPANET, Services available on Internet, Internet application : Email, WWW, and file transfer , Internet addressing, Domain name system(DNS), Internet security- Firewall , Encryption.

UNIT-V

Application of IT and latest IT trends : IT in business, Industry, home, education, entertainment, science and engineering and medicine. Ecommerce , M-commerce

Latest IT trends : Artificial intelligence, Data mining, Overview of geographic information system(GIS) , Cloud computing, Big Data.

TEXTBOOKS:

1. “Fundamental of computer “, V. Rajaraman, PHI Publication
2. “Introduction to information technology”, V. Rajaraman, PHI Publication
3. “Information Technology today” , S. jaiswal
4. “Fundamental of IT”, Leon and Leon , Leon Tec world
5. “Introduction to Information Technology”, Aksoy and Denardis, Cengage learning

MCS 105: PROGRAMMING IN C

UNIT-I

COMPUTER FUNDAMENTALS, INTRODUCTION TO C: The C character set, identifiers and keywords, data types, constants, variables and array declaration, expressions, statements, symbolic constants. **OPERATORS:** Arithmetic, Relational, Logical, Conditional, Bitwise, COMMA operator etc., library functions, data input/output, preparing and running complete C program.

UNIT-II

CONTROL STATEMENTS: preliminaries, if-else, nested if- else, goto statements, switch, break, continue, while, do-while, for, nested loops.

ARRAYS: Definition, array declaration and assignments, processing an array, passing arrays to a function, multi dimensional arrays.

UNIT-III

FUNCTIONS: A brief overview, defining a function, accessing a function, passing arguments to a function, specifying arguments data types, function prototypes, recursion. Program structure, storage classes, automatic variables, external variables, static variables.

STRING: Introduction, Operation function: strlen(), strcmp(), stricmp(), strncmp(), strncmp(), strcpy(), strcat(), strrev() and their implementation.

UNIT-IV

POINTERS: Fundamental, pointer declarations, passing pointers to a function, operations on pointers, pointer to pointer, array of pointers, dynamic memory allocation, preprocessor, macro expansion:#define, macro v/s function, file inclusion:#include.

UNIT-V

STRUCTURES AND UNIONS: user define data types, defining a structure, accessing structure elements, structure pointer, passing structure to a function, self referential structure, union and enumeration.

TEXT/REFERENCES BOOKS:

1. "Programming with C", E. Balaguruswamy, TMH (Latest Edition)
2. "Exploring C", Yashavant P. Kanetkar, BPB, (Latest Edition)
3. "Understanding Pointers in C", Yashavant P. Kanetkar, BPB, (Latest Edition)
4. "Programming with C", Gottfried, Schaum's Outline Series (Latest Edition)
5. "Programming with C", Rajaraman R, PHI (Latest Edition)
6. "Programming with ANSI C", B.T. Holmes, BPB (Latest Edition)
7. "The C Programming Language", Kernighan & Ritchie, PHI (Latest Edition)

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Scheme and Syllabus

SEMESTER: II

Course Code	Course Name	T	P/T	C	Sessional Marks	End Semester Marks	Total Marks
MCS 201	Computer Organization & Architecture	4	1	5	25	75	100
MCS 202	Mathamatics-2	4	1	5	25	75	100
MCS 203	Microprocessor and Assembly Language Programming	4	1	5	25	75	100
MCS 204	Environment Study	4	1	5	25	75	100
MCS 205	Object Oriented Programming with C++	4	1	5	25	75	100
MCS 206	Programming in C++ Lab	-	3	3	-	-	50

MCS 201: COMPUTER ORGANIZATION AND ARCHITECTURE

UNIT-I

Computer Organization: Introduction, Von Neumann Architecture, Harvard Architecture, Functional Units and Components in Computer Organization, Program Development Tools, Machine Language, Assembly Language, Instruction Codes, Computer Registers, Computer Instructions, Instruction cycle.

UNIT-II

Central Processing Unit: Stack organization, Instruction formats, Addressing modes, DATA Transfer and manipulation, Program control, Reduced Instruction Set Computer (RISC), Complex Instruction Set Computer (CISC).

UNIT-III

Pipeline & Vector Processing: Basic Concepts in Pipelining, speed-up, throughput, efficiency, instruction pipeline, Instruction Pre-fetch and Branch Handling, Data Buffering, Internal Forwarding, Data Dependant Hazards.

UNIT-IV

The Memory System: Memory Hierarchy, Main memory, Auxiliary memory, Associative memory, Cache memory, Virtual memory, Memory management hardware.

UNIT-V

Input-Output Organization: Peripheral Devices, Input-Output Interface, Asynchronous data transfer Modes of Transfer, Priority Interrupt, Direct memory Access, Memory mapped I/O, Input –Output Processor (IOP).

TEXT BOOKS:

1. “Computer System Architecture”, M.Moris Mano, 3rd Edition, PHI / Pearson, 2006.
2. “Computer Organization and Architecture”, William Stallings 7th Edition, PHI/Pearson, 2006.

REFERENCE BOOKS:

1. “Computer Organization”, Car Hamacher, Zvonks Vranesic & Safwat Zaky, 5th Edition, TMH, 2002.
2. “Computer Architecture and Organization”, John P. Hayes, TMH International Editions, 1998.
3. “Computer Architecture and Organization”, Raj Kamal, Nicholas Carter, 2nd Edition, TMH Education, 2009
4. “Introduction to computer architecture”, Stones S. Galgotia Publication
5. “Computer Organization and Architecture design for Performance”, 4th edition - W. Stallings, PHI
6. “Computer Engineering - Hardware Design”, M. Morris Mano, PHI
7. “Computer Architecture and parallel processing”, Kai Hwang & Faye Briggs, McGraw hill, 1985

MCS 202: MATHEMATICS-2

UNIT-I

Errors and precision, errors due to round off, Solution of Algebraic and Transcendental Equations, Bisection Method, Method of False Position, Newton-Raphson Method.

UNIT-II

Interpolation: Introduction, Newton's Backward Interpolation formula, Newton's Forward Interpolation formula, Gauss's forward Interpolation Formula, Gauss's Backward Interpolation formula, Lagrange's Interpolation formula, Newton divided difference formula.

UNIT-III

Curve Fitting: Graphical method, Laws reducible to the linear laws, Principle of least square, Method of least squares, fitting a curve of type $y = a+bx^2$, $y = ax+bx^2$, $y = ax+b/x$, $y = ax^2+bx$, $y = ax^b$, $y = ae^{bx}$, $xy^a = b$, Method of group averages

UNIT-IV

Numerical Differentiation- Forward Difference formula, Backward Difference formula, Numerical Integration : Quadrature formulae , Errors in Quadrature formulae, Romberg's Method, Euler –Maclaurin formula.

UNIT-V

Numerical solution of Ordinary Differential equations: Picard's method, Taylor's series method, Euler's method, Modified Euler's method, Runge's method, Runge-kutta method

TEXT /REFERENCE BOOKS:

1. "Numerical Analysis", S.S. Sastry, PHI
2. "Numerical Method in Engineering and Science", Dr. B.S. Grewal, Khanna Publishers, 2010
3. "Computer Oriented Numerical Methods", Rajaraman, PHI
4. "Numerical Computations", Venkataraman
5. "Computer Oriented Numerical Methods", Stoer, Bullrich, Springer Verlag, 1980

MCS-203 MICROPROCESSOR AND ASSEMBLY LANGUAGE PROGRAMMING

UNIT-1

Fundamental definition of Microprocessor, evolution of Microprocessor, Microprocessor Instruction set and Computer Languages, From large scale to single chip microcontrollers, Von Neumann and Harvard architecture, RISC vs. CISC, Application: Microprocessor Controlled Temperature System.

UNIT-2

Register organization of 8086, Architecture, signal description of 8086, Physical memory organization , General Bus operation, I/O addressing capability, Special processor activities, Minimum mode 8086 system and timings, Maximum Mode 8086 system and timings, The processor 8088.

UNIT-3

8086/8088 instruction set and assembler directives: Machine language instruction format, Addressing mode of 8086, Instruction set of 8086/8088, Assembler directives and operators.

UNIT-4

Assembly language programming Examples, Machine coding programs
Special architectural features: stack structure of 8086/8088, interrupt and interrupt services routine , interrupt cycle of 8086/8088, Non maskable interrupt, Maskable interrupt.

UNIT-5

Case study of Intel i series of processors.

TEXT BOOKS:

1. "Advanced microprocessor and Peripherals", A .K. Ray and K.M.Bhurchandi, TMH, 2000.
2. "Micro Controllers", Deshmukh, TMH.
3. "Microprocessors Architecture, Programming and Applications", Ramesh S. Goanker, Wiley Eastern, 1994 or (Latest Edition)

REFERENCE BOOKS:

1. "Micro Processors & Interfacing", Douglas U. Hall, 2007. "The 8088 and 8086 Micro Processors", 4th Edition, PHI, 2003.
2. "Micro Computer System 8086/8088 Family Architecture, Programming and Design", Liu and GA Gibson, 2nd Edition, PHI
3. "Introduction to Microprocessors", Aditya P. Mathur, TMH, 1995

MCS 205: OBJECT ORIENTED PROGRAMMING WITH C++

UNIT-I

Introduction, Procedure-Oriented Programming paradigm, Object-Oriented Programming paradigm, Procedure oriented Vs Object oriented, basic characteristics of OOP's: object, class, encapsulation, inheritance, reusability, polymorphism and overloading, static and dynamic binding, message passing, benefits of OOP's and application of OOP's.

UNIT-II

C++ Basics: Overview, Environment Setup, Basic Syntax, Comments, Basic Data types, Tokens, identifiers, Keywords, Constants/Literals, Variables, Variable Scope, Modifier Types, Storage Classes, Operator, array, pointer and reference variable, I/O statements, namespace, typecasting, control statements: if statement, if- else statement, nested if-else statement, ladder if-else, switch statement, for loop statement, while loop statement, do-while loop statement.

UNIT-III

Objects and classes : Basics of object and class and abstract class in C++, private and public members, static data and function members, function prototype, inline functions, function overloading, friend functions, default arguments, constructors and their types, destructors, friend class, dynamic allocation operator new and delete.

UNIT-IV

Inheritance: Concept of Inheritance, types of inheritance: single, multiple, multilevel, hierarchical, hybrid, protected members, overriding, virtual base class, resolving ambiguity.

Polymorphism: Pointers in C++, Pointes to objects, this pointer, virtual class, virtual and pure virtual functions.

UNIT-V

I/O Files and Streams: Concept of streams, cin and cout objects, C++ stream classes, Unformatted and formatted I/O, File stream, C++ File stream classes, File management functions(read(), write(), put(), get(),tellig() tellp(), seekg() seekp()).

TEXT/REFERENCE BOOKS:

1. "Object-Oriented Programming with C++", E. Balaguruswamy, TMH
2. "C++ The Complete Reference", Herbert Schildt, Osborne, TMH, latest
3. "Object-oriented programming with C++", Robert Lafore, Macmillan computer
4. "Tech yourself C++", Herbert Schildt, Osborne, TMH
5. "C & C++ Complete reference", Herbert Shieldt, Osborne, TMH
6. "Object-Oriented programming in C++", Nabajyoti Barkakati, PHI
7. "C++ Primer Plus", Stephen Prata, Galgotia Publications, 1996
8. "Object-Oriented analysis and Design with applications", Grady Booch

Department of Computer Science & Application

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Scheme and Syllabus

2014-15

SEMESTER: III

Course Code	Course Name	T	P /T	C	Sessional Marks	End Semester Marks	Total Marks
MCS 301	Data structure using c and C++	3	2	5	25	75	100
MCS 302	Mathamtics-3	5	-	5	25	75	100
MCS 303	Operating System	3	2	5	25	75	100
MCS 304	Data Communication and networking	4	1	5	25	75	100
MCS 305	Data Structure& Operating System Lab	-	5	5	25	75	100

MCS 301: DATA STRUCTURE USING C AND C++

UNIT 1

Introduction of Data structure, Data types: primitive, non-primitive data types, ADT, Linear and non linear data structure.

List Structures: Arrays: One dimensional, Multidimensional arrays, allocation methods, address calculations, sparse arrays. Linked List: Singly and Doubly Linear link lists, singly and doubly circular linked list: Definitions, operations (INSERT, DELETE, TRAVERSE) on these list. (Insertion operation includes – insertion before a given element, insertion after a given element, insertion at given position, insertion in sorted linked list)

UNIT 2

STACKS: Stack: Definition, Operations PUSH, POP, TRAVERSE, implementations using array and linked list, Applications of stack: Infix, Prefix, Postfix representation and conversion using stack, Postfix expression evaluation using stack.

QUEUES: Introduction, and Types of Queues: Priority Queue, Circular queue, Double Ended Queue, operations (INSERT, DELETE, TRAVERSE), implementation using array and linked list and applications

UNIT 3

Definition of trees and their types, Binary trees, Properties of Binary trees and Implementation operation (Insertion, deletion, searching and traversal algorithm: preorder, post order, in-order traversal), Binary Search Trees, Implementations, Threaded trees, AVL Trees, Balanced multi way search trees: 2-3 tree, Red Black tree, B tree, B+ tree, their applications

UNIT 4

SORTING: Types of sorting, Sequential Sort, Insertion Sort, Bubble Sort, Quick Sort, Merge Sort, Heap Sort, Radix sort.

SEARCHING: Linear search, Binary search, Hashing, collision resolution methods.

UNIT 5:

Definition of Graph and their types, adjacency and incident (matrix & linked list) representation of graphs, Graph Traversal – Breadth first Traversal, Depth first Traversal, Connectivity of graphs; Connected components of graphs, Weighted Graphs, Shortest path Algorithm, spanning tree, Minimum Spanning tree, Krushkal and prims algorithms.

TEXT/REFERENCE BOOKS:

1. “Data structures using C”, Tenenbum, PHI, 1996
2. “Fundamentals of Data Structures”, Horowitz and Sahani, Computer Science Press, 1978
3. “Data structures and Algorithms”, Aefred V. Aho, Jhon E. Joperoft and J.E. Ullman.
4. “An Introduction to Data Structures with Applications”, Jean Paul Trembley and Paul Sorenson, TMH, International Student Edition, 1985
5. “Data Structures and Program Design in C”, R. Kurse, Leung & Tondo, 2nd Edition, PHI publication

MCS 302: MATHEMATICS

UNIT-1

Matrix Theory: Definition, Type of Matrix, Elementary row and column operations on a matrix, Rank of matrix – Normal form – Inverse of a matrix using elementary operations, Eigen Value and Eigen Vector, - Characteristic roots and vectors of a matrix - Caley-Hamilton theorem and its applications.

UNIT-2

Successive differentiation, Leibnitz Theorem and applications, Taylor's and Maclaurin's series, curvature, asymptotes, curve tracing.

UNIT-3

Functions of two or more variables, partial derivatives, total differential and differentiability, derivatives of composite and implicit functions, Jacobians, higher order partial derivatives, homogeneous functions, Euler's Theorem and applications.

UNIT-4

Probability and Distribution – Definition, set notation of probability, Addition & Multiplication law of probability, Bayes theorem, Discrete & continuous probability distribution, Binomial distribution, Poisson Distribution and Normal Distribution.

UNIT-5

Sampling and Inference- Sampling Distribution, Testing of Hypothesis, Students t distribution, Chi-square Test, F Distribution, Fishers z Distribution.

TEXT/REFERENCE BOOKS:

1. Higher engineering Mathematics, B.S. Garewal, Khanna Publishers

MCS 303: OPERATING SYSTEM

UNIT-I: INTRODUCTION

Introduction: Definition, Computer-System Architecture, Types of Operating System, Micro Kernel and Monolithic Operating System, Special-Purpose Systems, Operating-System Operations, Computing Environments, operating system services, User Operating System Interface, System Calls and their types.

UNIT-II: PROCESS MANAGEMENT

CPU Scheduling: concepts, scheduling criteria, scheduling algorithms.

Inter-process communication, Mutual exclusion problem and critical section. Process synchronization, Classical IPC problems: Producer Consumer problem, Dining Philosophers problem, semaphores.

Deadlock: Necessary Conditions, deadlock handling methods: Deadlock Prevention, Deadlock detection and recovery, Deadlock avoidance, Bankers Algorithm.

UNIT-III: MEMORY

Memory Management: Background, Swapping, Contiguous Memory allocation, Paging, Segmentation.

Virtual Memory Background, Demand Paging, Page Replacement, Thrashing.

UNIT-IV: FILE MANAGEMENT

File System Implementation, File Concept, Access Methods, Directory Structure, File Sharing, Protection. File System Structure, File System Implementation, Directory Implementation, Allocation Methods, Free-space Management, Recovery.

UNIT-V: I/O MANAGEMENT

I/O Hardware, Application I/O Interface, Kernel I/O Subsystem, Transforming I/O to Hardware Operations, Disk Structure, Disk Scheduling, Disk Management.

TEXT/REFERENCE BOOKS:

1. "An Introduction to Operating Systems", H. M. Dietal, Addison Wesley
2. "Modern Operating Systems", Andrew S Tanenbaum.
3. "Operating System Concepts", 2nd Edition - Peterson & Silberschatz, Addison Wesley
4. "Operating Systems", Mardrick and Donovan, McGraw Hill
5. "Principles of Operating Systems", Ullman, Galgotia Publications.
6. "Operating System Concepts", Galvino & Silberschatz, Addison Wesley,(Latest Edition)

MCS- 304 COMPUTER NETWORKS

UNIT-I OVERVIEW OF DATA COMMUNICATION AND NETWORKING:

DATA COMMUNICATIONS: components, data representation, direction of data flow (simplex, half duplex, full duplex); Networks: distributed processing, network criteria, physical structure (type of connection, topology), categories of network (LAN, MAN, WAN),

INTERNET: brief history, internet today; Protocols and standards; Reference models: OSI reference model, TCP/IP reference model, their comparative study.

UNIT-II PHYSICAL LEVEL:

ANALOG & DIGITAL TRANSMISSION: transmission Impairments, Data Rates Limits, Digital to Digital Conversion, Line coding Scheme,

ANALOG TO DIGITAL CONVERSION: PCM, PAM, Delta Modulation, Transmission Modes, Parallel, Serials Asynchronous and Synchronous Communication

DIGITAL TO ANALOG CONVERSION: ASK, FSK, PSK, QPSK Constellation Diagram, QAM

ANALOG TO ANALOG CONVERSION: AM, FM, PM, Bandwidth Utilization, Multiplexing: FDM, WDM and TDM

Switching

TRANSMISSION MEDIA: Guided Media: Twisted Pair, Coaxial and Fiber Optic, Unguided Media: Wireless, Radio Waves, Microwaves and Infrared

UNIT-III DATA LINK LAYER:

FLOW CONTROL: Protocols: Stop & wait ARQ, Go-Back- N ARQ, Selective repeat ARQ, HDLC;

MEDIUM ACCESS SUB LAYER: Point to point protocol, LCP, NCP, FDDI, token bus, token ring; Reservation, polling, concentration;

MULTIPLE ACCESS PROTOCOLS: Pure ALOHA, Slotted ALOHA, CSMA, CSMA/CD, FDMA, TDMA, CDMA; Traditional Ethernet, fast Ethernet.

UNIT-IV NETWORK LAYER:

INTERNETWORKING & DEVICES: Repeaters, Hubs, Bridges, Switches, Router, Gateway;

ADDRESSING: Internet address, classful address, subnetting, classless address

ROUTING: techniques, static vs. dynamic routing, and routing table for classful address

ROUTING ALGORITHMS: shortest path algorithm, flooding, distance vector routing, link state routing

PROTOCOLS: ARP, RARP, IP, ICMP, IPV6; Unicast and multicast routing protocols.

UNIT-V TRANSPORT LAYER AND APPLICATION LAYER:

PROCESS TO PROCESS DELIVERY: UDP; TCP; Congestion control algorithm: Leaky bucket algorithm, Token bucket algorithm, choke packets; Quality of service: techniques to improve Qos DNS; SMTP, SNMP, FTP, HTTP, Firewalls.

MODERN TOPICS: Wireless LAN: IEEE 802.11; Introduction to blue-tooth, VLAN's, Cellular telephony & Satellite network.

TEXT BOOKS:

1. "Data Communications and Networking", B. A. Forouzan, TMH, (Latest Edition)
2. "Computer Networks", A. S. Tanenbaum, 4th Edition, Pearson Education/PHI
3. "Data and Computer Communications", W. Stallings, 5th Edition, PHI/ Pearson Education

REFERENCE BOOKS:

1. "Computer Networking -A top down approach featuring the internet", Kurose and Rose, Pearson Education
2. "Communication Networks", Walrand, TMH (Latest Edition)
3. "Internetworking with TCP/IP, vol. 1, 2, 3", Daglous E. Comer, 4th Edition Pearson Education/PHI

Department of Computer Science & Application

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Scheme and Syllabus

SEMESTER: IV

Course Code	Course Name	L	P/T	C	Sessional Marks	End Semester Marks	Total Marks
MCS 401	Introduction to Java	4	1	5	25	75	100
MCS 402	Operations Research	4	1	5	25	75	100
MCS 403	System Analysis and Design	4	1	5	25	75	100
MCS 404	Database Management System	4	1	5	25	75	100
MCS 405	Java and DBMS Lab	-	5	5	25	75	100

MCS-401 INTRODUCTION TO JAVA

UNIT-1

Overview of JAVA : The genesis of java, An overview of java, Java virtual machine (JVM) ,Java development kit (JDK) ,Java Vs C++, Data types, Literals, Variables, and Arrays, Operators, Control statements.

UNIT-II

Introducing Class: Class fundamentals, Closer look at Methods and class ,Nested and inner class ,Exploring Java.lang, String handling ,Constructor ,this keyword, Garbage collection and finalize() method. Writing simple JAVA program.

UNIT-III

Inheritance: Basics ,Types of inheritance ,Access specifier ,using super, method overriding ,Abstract class ,constructor in multilevel inheritance ,using final with inheritance ,Dynamic method dispatch ,Abstract class ,

UNIT-IV

Package and Interface: Defining package, CLASSPATH, Access protection ,Importing package ,Defining and implementing interface ,Variable in interface ,Extending interface, Nested interface.

UNIT-V

Exception handling and Multithreading: Using try and catch ,multiple catch classes, Nested try statements , throw ,throws and finally ,Built in exception ,Uncaught exception , Creating own exception class , Java Thread Model: Main thread ,Creating own Thread ,Life cycle of thread, Thread priorities ,Synchronization and messaging, Interthread communication ,Suspending ,Resuming and stopping thread.

TEXT/REFERENCE BOOK

1. Java: The complete reference By Naughton P and schildt H. ,Osborne Tata Mcgraw-Hill.
2. Java Programming By E.Balguruswami
3. Core JAVA for beginners By Rashmi Kanta Das ,Vikas Publication.
4. Core JAVA : A Comprehensive Study by Mahesh P. Matha , PHI publication.

MCS 402: OPERATIONS RESEARCH

UNIT-I

Introduction to Operations Research: Introduction and History, Definition and concept, Characteristics or significant features of Operations research, General methods for solving Operations Research Models, Phases of Operations Research methods, Scope, Shortcomings, Applications, Techniques.

UNIT-II

Linear Programming: Introduction, Salient features of Linear programming (Terminology), Advantages, Limitations, Applications, Formulation of linear programming model, Simplex method.

UNIT-III

Transportation Problems: Introduction, North West Corner Method, Vogel's Approximation Method, Optimality test: Stepping stone method and MODI method.

UNIT-IV

Assignment Models: Introduction, mathematical formulation of the problem, Hungarian method, Sample Problems, Special case in assignment.

UNIT-V

Sequencing Problems: Introduction, general sequencing formula, Processing n jobs through two machines, Processing n jobs through three machines, Processing n jobs through m machines.

TEXT BOOKS:

1. Manohar Mahajan, "Operations Research", Dhanpat Rai & Co., 2013.
2. P. Sankara Iyer, "Operations Research", Tata McGraw-Hill, 2008.
3. A.M. Natarajan, P. Balasubramani, A. Tamilarasi, "Operations Research", Pearson Education, 2005.

REFERENCE BOOKS:

1. J K Sharma., "Operations Research Theory & Applications , 3e", Macmillan India Ltd, 2007.
2. P. K. Gupta and D. S. Hira, "Operations Research", S. Chand & co., 2007.
3. J K Sharma., "Operations Research, Problems and Solutions, 3e", Macmillan India Ltd.
4. N.V.S. Raju, "Operations Research", HI-TECH, 2002.

MCS-403: SYSTEM ANALYSIS AND DESIGN

UNIT-I

THE SYSTEM CONCEPT; Elements of a system, types of system. Introduction to system development life cycle, Recognition of need, prototyping.

UNIT-II

Introduction to system analysis, determining the users information requirements, problem definition, Background analysis, fact-finding, fact analysis.

Introduction to structured analysis, the tools of structured analysis, Feasibility study; oral representation, Data analysis, Cost/ Benefit analysis

UNIT-III

INTRODUCTION TO SYSTEM DESIGNS: The Process and stages of Systems Design, Design methodology, structured design, structured walkthrough, Major development activities, Data validation, Introduction Input/output and forms Design

UNIT-IV

INTRODUCTION TO SYSTEM TESTING: The Test Plan, Quality assurance, Post implementation review, Software maintenance, Procedure for Hardware/Software selection

UNIT-V

Project Management and Control, Project Control, Gantt Chart, PERT and CPM, System Security.

TEXT BOOKS:

1. System Analysis and Design, Elias. M. Awad, Galgotia Publication.

REFERENCE BOOKS:

1. Kendall and Kendall, System analysis and Design, PHI.
2. Igor Hawryszkiewicz, Introduction to System analysis and Design, PHI

MCS 404: DATA BASE MANAGEMENT SYSTEMS

UNIT-1

Introductory Concepts: Introduction, Instance and schema, View of Database system, Database languages, Data Base architecture, Database Administrator

UNIT-2

Database Design and ER- Model – Introduction, Entity, Relationship, Attributes, Constraints, ER Diagram, Reduction to Relational Schema, Specialization, Generalization, Aggregation.

UNIT-3

Relational Database Design: Functional Dependency, 1NF, 2NF, 3NF, BCNF, 4NF, 5NF, Comparison of BCNF and 3NF, Closure of set of functional Dependency, Closure of Attribute Sets, Canonical Cover, Lossless Decomposition, Dependency Preservation

UNIT-4

Relational Database-Structure of Relational Database, Schema, Keys, Relational Operation- Selection, Projection, Natural Join, Cartesian Production, Union, Intersection and Minus operation

UNIT-5

SQL- Basic Data Types, Create Table, Drop Table Alter Table, Queries on Multiple Relation, Join Operation, String Operation, Set Operation, Grouping, Nested Sub queries

TEXT/REFERENCE BOOKS:

1. “Fundamentals of Database System”, R. Elmasri & S. Navathe
2. “Data Base Management System”, Henry F. Korth & Abraham Silberschats, TMH, 1991.
3. “An Introduction to Database Management System”, Vol I &II, Date C.J., Addison Wesley, 1981, 1983

Department of Computer Science & Application

Bilaspur University, Bilaspur (C. G.)

Five Years Integrated B.Sc./M.Sc.(Computer Science)

Scheme and Syllabus

SEMESTER:

V

Course Code	Course Name	L	P/T	C	Sessional Marks	End Semester Marks	Total Marks
MCS 501	Theory of Computation	4	1	5	25	75	100
MCS 502	Web Technology	4	1	5	25	75	100
MCS 503	Software Engineering	4	1	5	25	75	100
MCS 504	Artificial Intelligence and Expert system	4	1	5	25	75	100
MCS 505	Web Technology Lab	-	5	5	25	75	100

MCS 501: THEORY OF COMPUTATION

UNIT I:

Sets, Relations and Functions, Fundamental Proof Techniques, Introduction of alphabets, Strings and Languages; Automata, Finite automata (FA), Transition System & Function and their properties; Deterministic Finite Automata (DFA) -Formal definition, simplified notations (state transition diagram, transition table), Non-deterministic Finite Automata (NFA -Formal Definition, Acceptability of a String by a DFA & NFA.), Minimizing number of state of a DFA, Finite Automata with output (Moore and Mealy Machine, Procedure for Transforming a Mealy Machine into a Moore Machine and vice versa

UNIT-2

FORMAL LANGUAGES: Definition of a Grammar, Derivations and the Language Generated by a Grammar, Chomsky Classification of Languages, Languages and Their Relation, Recursive and Recursively Enumerable Sets, Operations on Languages, Languages and Automata

UNIT 3:

Regular expressions (RE)- Definition, FA and RE, Transition System Containing A-moves, NFAs with A-moves and Regular Expressions, NFA to DFA conversion, Algebraic Method Using Arden's Theorem, Construction of Finite Automata Equivalent to a Regular Expression and vice versa, Equivalence of two FA, Equivalence of two RE, Pumping Lemma for Regular Sets, Application of Pumping Lemma, Closure Properties of Regular Sets, Regular Sets and Regular Grammars, Closure Properties of Regular languages, emptiness, finiteness, membership.

UNIT 4:

Context-free Grammars (CFGs)-Formal definition, sentential forms, leftmost and rightmost derivations, The language of CFG, Derivation tree, Ambiguity in grammars and Languages, Ambiguity in CFG, Simplification of CFG, Normal Forms for CFG (Chomsky Normal Form, Greibach Normal Form), Pumping Lemma for Context-free Languages, Closure Properties of CFG's

UNIT 5:

Pushdown Automata (PDA):Formal definition, acceptance by PDA, PDAs and CFGs, CFG to PDA, PDA to CFG, DPDAs -Definition, DPDAs and Regular Languages, DPDAs, and CFLs, Languages of DPDAs, DPDAs.

Context Sensitive Grammar, Linear Bounded Automata, Turing Machines -Formal definition and behaviour, Transition diagrams, acceptance by TM, Multi tape Turing Machine, Universal Turing Machine, Halting Problem of Turing Machine

TEXT/REFERENCE BOOKS:

1. "Elements of The Theory of Computation", H.R.Lewis & C.H. Papadimitriou, P.H.I.
2. "Introduction To Automata Theory, Language and Computation" J.E.Hopcroft, R.Motwani J.D.Ullman, Pearson Education
3. "Theory of Computer Science(Automata, Languages And Computation)", K.L.P.Mishra, N.Chandrasekaran:,PHI
4. "Introduction to languages and Theory of Computation", John Martin, McGraw Hill
5. "Introduction To Computer Theory", D.A.Cohen (J.Wiley)

MCS 502: WEB TECHNOLOGY

UNIT-1

WEB BASICS : What is web, Characteristics of good web design, URL, Web Browser, WWW, Web Server ,HTTP, search engine, Tools for web site creation.

UNIT-2

HTML/DHTML :Introduction , Elements, Attributes, Headings, Paragraphs, Styles Formatting, Quotations, Comments , Hyper-Links, Images, Tables, Lists, Frames, Forms, Input Types, Input Attributes

UNIT-3

CSS : Introduction, Syntax, measurement units, colors, Backgrounds, Font, Text, position, Align, Images, Link, Table, List, Padding, Cursor, Rounded corner, Borders, Multi Background

UNIT-4

JAVASCRIPT: Overview, syntax, Enabling Java script, Variables, Operators, Decision control statement: If-else, Switch Case; Looping statement: while loop, for loop, for..in Loop

UNIT-5

JavaScript functions, events, Cookies, Page Redirect, Dialog Boxes, Page printing, Error handling, Validation, Debugging, Image Map,

XML: Introduction to XML, Difference between XML and HTML

TEXT/REFERENCE BOOKS:

1. "Internet and Internet Engineering", Daniel Minoli, TMH (Latest Edition)
2. "Java Script", Gosslin, Vikas (Latest Edition)
3. "HTML The Definite Guide", Chuckmusiano & Bill Kenndy, O Reilly (Latest Edition)
4. "Dynamic HTML", Joseph Schmuller, BPB, 2000.

MS 503: SOFTWARE ENGINEERING

UNIT I

Introduction to Software Engineering: Definition, Evolution, Principles, Exploratory style of software development, Need of software engineering, Emergence of software engineering, Computer systems engineering.

UNIT II

Software Life Cycle Models: Definition, Classical Waterfall model, Iterative Waterfall model, V-model, Prototyping model, Incremental development model, Evolutionary model, Rapid Application Development(RAD), Agile model, Extreme programming model, Spiral model.

UNIT III

Software Project Management (SPM): SPM complexities, responsibilities of a software project manager, project planning, metrics for project size estimation, project estimation techniques, COCOMO model, Scheduling: Work breakdown structure, Activity networks, Critical Path Method (CPM), PERT, risk management, software configuration management.

UNIT IV

Requirements Analysis and Specification: Requirements gathering, requirements analysis, Software Requirements Specification (SRS): Users of SRS Document, Need of SRS, Characteristics of SRS Document, functional requirements, non-functional requirements, goals of implementation; **Software Design:** Characteristics, Outcome of the Design process, Cohesion and Coupling, Approaches to software design, Data Flow Diagram (DFD), Data dictionary.

UNIT V

Coding and Testing: Coding standards and guidelines, code review, software documentation, Testing: Basic concepts and terminologies, verification, validation, testing process, unit testing, black-box testing, white-box testing, Control flow graph, cyclomatic complexity, mutation testing, debugging, integration testing, system testing.

TEXT/ REFERENCE BOOKS:

1. “Fundamentals of Software Engineering”, Rajib Mall, PHI
2. “Software Engineering, A Practitioner’s Approach”, Roger Pressman”, 4th Edition, TMH.
2. “Software Engineering”, P.S.Pressman, TMH
3. “An Integrated Approach of Software Engineering”, Pankaj Jalote, Galgotia
4. “Software Engineering”, M.Shooman, TMH

MCS-504 ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEM

UNIT -I

Introduction: Overview of Artificial Intelligence (AI), Foundations of A.I., History of AI, Areas and state of the art in A.I. ,Knowledge: Introduction ,Knowledge Based system ,Knowledge representation techniques.

UNIT II

A.I. Programming languages –Introduction to LISP ,Basic list manipulation functions, Input/output and local variables, Lists and Arrays, simple program in LISP , Introduction to PROLOG.

UNIT III

Problems and Heuristic Search Techniques: Problem solving as state space search, production system, control strategies and problem characteristics; Search techniques: Breadth First , Depth-first search, Hill-climbing, Heuristics search, Best-First search.

UNIT IV

Knowledge Representation – Approaches and Issues ,Frame, Conceptual dependency , Semantic Net ,Scripts etc. ,Propositional Logic , First order , Propositional Logic (FOPL), Conversion to clausal form, Inference rules, Resolution principal.

UNIT V

Expert System- Introduction ,Application ,Existing Expert systems. Components of typical expert system ,Rule based system architecture,

TEXT/REFERENCE BOOKS

1. Dan W. Patterson, Introduction to Artificial Intelligence and Expert Systems , PHI Publication.
2. Elaine Rich and Kevin Knight , Artificial Intelligence ,TMH publication.
3. V.S. Jankiraman ,K. Sarukesi and P.Gopalakrishnan ,Foundations of Artificial Intelligence and Expert Systems , Macmillan Series in Computer Science.

Department of Computer Science & Application

Bilaspur University, Bilaspur (C. G.)

Five Years Integrated B.Sc./M.Sc.(Computer Science)

Scheme and Syllabus

SEMESTER: VI

Course Code	Course Name	T	P / T	C	Sessional Marks	End Semester Marks	Total Marks
MCS 601	Introduction to Artificial Neural Networks	4	1	5	25	75	100
MCS 602	Computer Graphics	4	1	5	25	75	100
MCS 603	ASP.NET	4	1	5	25	75	100
MCS 604	Major Project	-	-	-	-	200	200

MCS-601 - INTRODUCTION TO ARTIFICIAL NEURAL NETWORKS

UNIT-1

Introduction: History, Definition and meaning, Different areas of Artificial Intelligence, Applications, Essence and benefits of neural networks.

UNIT-2

Basic Neural Network Model: Biological model, Artificial neuron Vs Biological neurons, Types of Neural Network, Model of an artificial Neuron, Activation function, Weights, bias, meaning of learning and training, Types of learning.

UNIT-3

Neural network architecture: Single layer and multilayer perceptrons, transfer functions Training of a simple perceptron: Training of a single layer neural network with simple example like AND, OR logic gates.

UNIT-4

Multilayer Neural Network: Types of Multi Layer Neural Network, Feed forward neural network, Delta learnig rule, Back propogation network, Error back propogation Algorithm.

UNIT-5

Application of ANN: Application of ANN in various domains.

Reference Books

1. Neural Networks: A comprehensive Foundation (2e preferred): Simon Haykins, Prentice Hall of India.
2. Sivanadam and Deepa: Principal of Soft Computing, John wiley and sons.
3. Neural Networks for Pattern Recognition: Christopher M Bishop: Oxford Press
4. Introduction to Artificial Neural Systems:J.M.Zurada, West Publishing Company, St. Paul, Minnesota, 1992 / Jaico Publishing House, Bombay, 1994
5. K.Vinoth Kumar and R. Saravana Kumar, Neural Network and Fuzzy Logic, Katsoon Books.

MCS 602: COMPUTER GRAPHICS

UNIT-I

Introduction to Computer Graphics, Application of Graphics, Display Devices: Refresh Cathode-Ray Tubes, Raster Scan Displays, Random Scan Displays, Color CRT Monitors and Flat Panel Displays. Video cards/display cards. Graphic Software, Graphics Software Standard and Software Packages

UNIT-II

Line Generation Algorithms: DDA algorithm, Bresenham's algorithm; **Circle Generation Algorithms:** Midpoint Circle algorithm

Polygon filling Algorithms: Scan Line Polygon fill algorithm, Inside - Outside Tests, Boundary-Fill algorithm, Flood - Fill algorithm. Fundamentals of aliasing and Antialiasing Techniques.

UNIT-III

Two Dimensional Viewing: Window to Viewport coordinates transformation.

Clipping: Clipping operations, Point clipping, **Line clipping:** Cohen Sutherland Algorithm, Liang Barsky Algorithm, Nicholl-Lee-Nicholl Algorithm, **Polygon clipping:** Sutherland- Hodgeman Algorithm, Weiler Atherton Algorithm,

Text clipping, Exterior clipping

Two Dimensional Transformations: Translation, Scaling, Rotation, Reflection, Shear

UNIT IV

Three Dimensional Viewing: 3D Geometry, 3D display techniques, transformations. **Projections:** Parallel Projection, Perspective Projection. Orthogonal Projection

.

UNIT V

Color Models and Color Application: Color Model, Standard Primaries and the Chromaticity Diagram, XYZ Color Model, CIE Chromaticity Diagram. RGB Color Model, YIQ Color Model, CMY Color Model, HSV Color Model. Conversion between HSV and RGB Models. HLS Color Model, Color Selection and Application.

Case study of OpenGL

TEXT/REFERENCE BOOKS:

1. "Principles of Interactive Computer Graphics", Newman, W. Sproul, R.F., TMH,1980
2. "Fundamentals of Interactive Computer Graphics", Foley J.D., Van Dome, Addison Wesley,1982
3. "Computer Graphics", Hearn D., Baker, PHI, 1986
4. "Procedural Elements for Computer Graphics", Rogers D. F., TMH, 1986
5. "Computer Graphics using OpenGL", F. S. Hill Jr., Pearson Education, 2003.

MCS 603: ASP.NET using C#

UNIT-I

Evolution of Web Development, .NET framework, .NET languages, Common Language Runtime, .NET class library, ASP.NET: introduction and evolution

UNIT-II

C# language: Basic, variable and Data Types, math and type conversion operation, conditional statements, loop statements, Methods, class, object, static member, overloading, inheritance, constructor, events, partial class, namespace and assemblies

UNIT-III

Visual studio: Visual studio IDE, Code editor, Visual Studio Debugging, Creating Websites, Designing Web form, Anatomy of a Web Form, Writing Code, Visual Studio Debugging. Page class, Application events, ASP.NET configuration; Web controls: List Controls, Input Validation Controls, Master Page Basics, Website Navigation: Site Maps, TreeView Control, Menu Control

UNIT IV

Error Handling: Common Error, Exception Handling, Handling Exceptions, Throwing Your Own Exceptions, Logging Exceptions; ADO.NET Fundamentals: ADO.NET architecture, Connection class, Command class, Data reader class, DataSet, DataAdapter class, DataView class. .

UNIT V

Data Binding: Basic Data Binding, Data Source Controls, SqlDataSource, ObjectDataSource; Rich Data Controls: GridView, Formatting the GridView, GridView Row Selection, Sorting the GridView, Paging the GridView, GridView Templates, ListView, DetailsView and FormView.

TEXT/REFERENCE BOOKS:

1. "Pro ASP.NET 4 in C# 2010", Matthew MacDonald, Apress
2. "ASP .NET 3.5 Website Programming Problem-Design -solution", Chris Love, Wiley Publication
3. "Beginning ASP.NET 4 in C# 2010 Matthew MacDonald, Apress
4. "Pro C# 5.0 and .Net 4.5 Framework", Andrew Troelson, Apress

Department of Computer Science & Application

Bilaspur University, Bilaspur (C. G.)

Five Years Integrated B.Sc./M.Sc.(Computer Science)

Scheme and Syllabus

SEMESTER: VII

Course Code	Course Name	T	P/ T	C	Sessional Marks	End Semester Marks	Total Marks
MCS 701	Cryptography and network security	4	1	5	25	75	100
MCS 702	Compiler Design	4	1	5	25	75	100
MCS 703	Analysis and Design of algorithm	4	1	5	25	75	100
MCS 704	Advance computing technologies	4	1	5	25	75	100
MCS 705	Analysis and Design of algorithm Lab	-	5	5	25	75	100

MCS-701 - Network Security and Cryptography

UNIT-I

Classical Encryption Technique- Basics of computer network, TCP/IP model, Foundations of Cryptography and security trends, Secret key Vs public key cryptography, Symmetric cipher model, substitution techniques, Transportation techniques, Mathematical tools for cryptography: modular arithmetic, Euclidean algorithm, finite fields, polynomial arithmetic.

UNIT-II

Symmetric cipher -Symmetric cipher model, Traditional block cipher: Stream and block cipher, Feistel cipher network structure, Design Principles of Block Ciphers, Data Encryption Standard (DES), Strength of DES Triple DES, Block cipher design principal, Block cipher operation, Advance encryption Standard (AES), Evaluation criteria of AES,AES transformation function, key distribution.

UNIT-III

Public Key cryptography and Hash Function- Principles of public key cryptosystem, requirement, RSA algorithm. Hash function, Key management: Diffie-Helman Key exchange, Man in the middle attack, elliptic curve arithmetic, elliptic curve cryptography, Application of cryptographic hash function, Hash and Message authentication Code (MAC), Hash and MAC algorithms, MAC based on hash function, Digital signature and Authentication protocol. Key management and distribution: Distribution of symmetric key and public key, Public key Infrastructure (PKI).

UNIT-IV

IP and Web security protocols-User authentication: principle, Remote user authentication using symmetric and asymmetric encryption, Kerberos, E-mail security: Pretty Good Privacy (PGP), S/MIME, IP security: IPsec, transport layer Security: Secure Socket layer (SSL), Secure Electronic Transaction (SET).

UNIT-V

System Security- Firewall, Intrusion Detection and prevention system (IDPS), Malicious Software.

Reference/Text Books

1. Cryptography and Network Security By William Stallings, 4th Edition Pearson Publication.
2. Network security and cryptography by Bernard Menezes, Cenage Learning India Pvt. Ltd. First edition 2010.
3. Applied cryptography - protocols and algorithm By Bruce Schneier, Springer Verlag 2003.
4. Cryptography and Network Security By Atul Kahate , TMH Publication.
5. Cryptography and Network Security By Behrouz A. Forouzan, First Edition, TMH Publication.
6. Network Security: Private Communication in Public World By Charlie Kaufman ,Radia Perlman and Mike Speciner, PHI Publication.

MCS-702 Compiler Design

UNIT I

Introduction: Introduction to Compiler, Analysis of the source program, phases of compiler, cousins of compiler, grouping of phases, compiler construction tools. **Lexical Analysis:** Role of Lexical Analyzer, Specification of tokens, Recognition of tokens, Regular expression, Finite automata, from regular expression to finite automata transition diagrams, Lex.

UNIT II

Syntax Analysis And Parsing Techniques: Context free grammars, Bottom-up parsing and top down parsing. Top down Parsing : elimination of left recursion, recursive descent parsing, Predictive Parsing ,Bottom Up Parsing : Operator precedence parsing, LR parsers, Construction of SLR, canonical LR and LALR parsing tables, Construction of SLR parse tables for Ambiguous grammar, the parser generator – YACC.

UNIT III

Syntax Directed Translation & Intermediate Code Generation : Synthesized and inherited attributes, dependency graph, Construction of syntax trees, bottom up and top down evaluation of attributes, S-attributed and L-attributed definitions ,Postfix notation; Three address codes, quadruples, triples and indirect triples, Translation of assignment statements, control flow, Boolean expression and Procedure Calls.

UNIT IV

Runtime Environment: Storage organization, activation trees, activation records, allocation strategies, Parameter passing symbol table, dynamic storage allocation.

UNIT V

Code Optimization & Code Generation: Basic blocks and flow graphs, Optimization of basic blocks, Loop optimization, Global data flow analysis, Loop invariant computations. Issue in the design of Code generator, register allocation, the target machine, and simple Code generator.

Text Books:

1. Compilers-Principles, Techniques and Tools, Alfred V. Aho, Ravi Sethi and Ullman J.D., Addison Wesley, 2 nd Ed.
2. Principle of Compiler Design, Alfred V. Aho, and J.D. Ullman, Narosa Publication.

Reference Books:

1. Compiler design in C, A.C. Holub, PHI.
2. Compiler construction (Theory and Practice), A.Barret William and R.M. Bates, Galgotia Publication.
3. Compiler Design, Kakde.

MCS-703 Design and Analysis of Algorithms

UNIT -I

Introduction of Algorithm, Analysis of algorithms, asymptotic notations, Standard notations and common functions, Recurrence solution: Substitution method, iteration method and the master method, algorithm design techniques: basic

UNIT -II

DIVIDE AND CONQUER: Binary search, Min-Max Problem, merge sort, quick sort, and Matrix Multiplication.

Introduction to NP-Completeness: The class P and NP, Polynomial reduction, NP-Completeness Problem, NP-Hard Problems

UNIT -III

Graph Algorithms: Undirected Graph, Directed Graph, Traversing Graphs, Representation of graphs, Breadth-first search, Depth-first search, strongly connected components, topological sort.

String Matching: Introduction, The naïve string matching algorithm, Rabin-Karp algorithm, String Matching with finite automata.

UNIT -IV

GREEDY METHOD: Knapsack problem, Huffman codes, job sequencing with deadlines, Minimum Spanning trees: Prim's and Kruskal's algorithms, Single Source Shortest path: Dijkstra's algorithm and Bellman Ford algorithms.

UNIT -V

DYNAMIC PROGRAMMING: 0/1 Knapsack problem, all Pair's shortest paths: Warshal's and Floyd's algorithms, Single source shortest paths, Backtracking, Branch and Bound: Travelling Salesman Problem.

TEXT /REFERENCE BOOKS:

1. "Introduction to Algorithms", Thomas H. Cormen et al., PHI
2. "Fundamentals of computer algorithms", Ellis Horowitz, Sartraj Sahni and Rajasekaran, Galgotia
3. "Design Methods and Analysis of Algorithms", Prof S.K.Basu, BHU, PHI
4. "Data Structures, Algorithms and Applications in C++", Sahni, TMH
5. "Design and analysis of computer algorithms", Aho A.V, Hopcroft, J.E. Ullman, , Addison-wesley
6. "Fundamentals of Algorithmics", Brassard and Bratley, PHI
7. "Data Structure in C", Andrew.S.Tanenbaum, PHI

MCS- 704 Advance Computing Technologies

Unit-I

Distributed System - Introduction, Advantages of Distributed System over Centralized Systems, Distributed System architecture, Design Issues of Distributed Systems

Unit-II

Grid- Grid computing overview, Application, benefits and limitation, Basic Constituent Elements: Functional view, Physical View, Service view, Open Grid Service Architecture, Open Grid Services Infrastructure

Unit-III

Cluster Computing- Cluster computing overview, architecture, Application, benefits and limitation, Types of cluster, Cluster components, Programming environment and tools

Unit-IV

Cloud Computing- Cloud Computing Overview, Architecture, Applications, Benefits & Limitations of Cloud Computing, Cloud Computing Models including Infrastructure/Platform/Software – as-a-service, Public cloud, private cloud and hybrid clouds, Cloud OS, Performance measure of cloud: Scalability, Performance, QoS.

Unit-V

Advance computing trends: DNA Computing, Quantum Computing, Parallel Computing, Ubiquitous Computing, Context aware computing, Fog computing, now computing, Internet of Thing

Reference/Text Books

1. Cloud Computing-A Practical Approach, Anthony T. Velte, Toby J. Velte, Robert Elsenpeter. McGrawHill.
2. Grid Computing, Joshy Joseph and Craig Fellenstein, Pearson Education 2004.
3. The Grid Core Technologies, Maozhen Li, Mark Baker, John Wiley and Sons , 2005.
4. Beowulf Cluster Computing with Linux, William Gropp, Ewing Lusk, Thomas Sterling, MIT Press, 2003.
5. Distributed and Cloud Computing, Kaittwang Geoffrey C.Fox and Jack J Dongrra, Elsevier India 2012

B.Sc. Computer Science Semester - II
Subject- Computer organisation and architecture

Section-A

Multiple choice/Very short type question

1. Operation is normally specified in one field, known as
 - a) Operand
 - b) Opcode
 - c) Operation
 - d) Instruction count
2. Von Neumann architecture is
 - a) SISD
 - b) SIMD
 - c) MIMD
 - d) MISD
3. Which of the following is lowest in memory hierarchy?
 - a) Cache memory
 - b) Secondary memory
 - c) Registers
 - d) RAM
4. The circuit used to store one bit of data is known as
 - a) Encoder
 - b) OR gate
 - c) Flip Flop
 - d) Decoder
5. Cache memory acts between
 - a) CPU and RAM
 - b) RAM and ROM
 - c) CPU and Hard Disk
 - d) None of these
6. A Stack-organised Computer uses instruction of
 - a) Indirect addressing
 - b) Two-addressing
 - c) Zero addressing
 - d) Index addressing
7. An n-bit microprocessor has
 - a) n-bit program counter
 - b) n-bit address register
 - c) n-bit ALU
 - d) n-bit instruction register

8. n bits in operation code imply that there are _____ possible distinct operators
- $2n$
 - $2^n / 2$
 - $n/2$
 - n^2
9. Which register keeps track of the instructions stored in program stored in memory.
- AR (Address Register)
 - XR (Index Register)
 - PC (Program Counter)
 - AC (Accumulator)
10. Memory unit accessed by content is called
- Read only memory
 - Programmable Memory
 - Virtual Memory
 - Associative Memory
11. MIMD stands for
- Multiple instruction multiple data
 - Multiple instruction memory data
 - Memory instruction multiple data
 - Multiple information memory data
12. A group of bits that tell the computer to perform a specific operation is known as
- Instruction code
 - Micro-operation
 - Accumulator
 - Register
13. The load instruction is mostly used to designate a transfer from memory to a processor register known as
- Accumulator
 - Instruction Register
 - Program counter
 - Memory address Register
14. The communication between the components in a microcomputer takes place via the address and
- I/O bus
 - Data bus
 - Address bus
 - Control lines
15. An instruction pipeline can be implemented by means of
- LIFO buffer
 - FIFO buffer
 - Stack

d) None of the above

16. A binary digit is called a
 - a) Bit
 - b) Byte
 - c) Number
 - d) Character
17. The operation executed on data stored in registers is called
 - a) Macro-operation
 - b) Micro-operation
 - c) Bit-operation
 - d) Byte-operation
18. MRI indicates
 - a) Memory Reference Information.
 - b) Memory Reference Instruction.
 - c) Memory Registers Instruction.
 - d) Memory Register information
19. An interface that provides a method for transferring binary information between internal storage and external devices is called
 - a) I/O interface
 - b) Input interface
 - c) Output interface
 - d) I/O bus
20. An address in main memory is called
 - a) Physical address
 - b) Logical address
 - c) Memory address
 - d) Word address
21. If the value $V(x)$ of the target operand is contained in the address field itself, the addressing mode is
 - a) immediate.
 - b) direct.
 - c) indirect.
 - d) implied.
22. The instructions which copy information from one location to another either in the processor's internal register set or in the external main memory are called
 - a) Data transfer instructions.
 - b) Program control instructions.
 - c) Input-output instructions.
 - d) Logical instructions.

23. Content of the program counter is added to the address part of the instruction in order to obtain the effective address is called.
- relative address mode.
 - index addressing mode
 - register mode.
 - implied mode.
24. An interface that provides I/O transfer of data directly to and from the memory unit and peripheral is termed as
- DDA.
 - Serial interface.
 - BR.
 - DMA.
25. What is the content of Stack Pointer (SP)?
- Address of the current instruction
 - Address of the next instruction
 - Address of the top element of the stack
 - Size of the stack.
26. The average time required to reach a storage location in memory and obtain its contents is called
- Latency time.
 - Access time.
 - Turnaround time.
 - Response time.
27. Interrupts which are initiated by an instruction are
- internal
 - external
 - hardware
 - software
28. Memory access in RISC architecture is limited to instructions
- CALL and RET
 - PUSH and POP
 - STA and LDA
 - MOV and JMP
29. When more than one processes are running concurrently on a system
- batched system
 - real-time system
 - multi programming system
 - multiprocessing system
30. Which one of the following is the address generated by CPU?
- physical address
 - absolute address
 - logical address

d) none of the mentioned

Answer:- 1.b 2.a 3.b 4.c 5.a 6.c 7.b 8.a 9.c 10.d 11.a 12.a 13.a 14.b 15.b 16.a 17.b
18.b 19.a 20.a 21.b 22.a 23.a 24.d 25.c 26.b 27.b 28.c 29.c 30.c

Section-B

Short answer type question

1. Explain von neuman architecture?
2. Give a brief overview of harvard architecture?
3. Write down the basic functional units of computer system?
4. Differentiate between assembly and machine language?
5. What do you mean by computer instruction?
6. Briefly explain fetch and execute cycle?
7. Define computer register?
8. What are the different types of computer registers?
9. Define an instruction code?
10. What do you mean by program control concept?
11. Name the four computer classification as per flynns?
12. What do you mean by instruction stream and data stream?
13. Explain relative addressing mode?
14. Differentiate between register direct mode and register indirect addressing mode?
15. Differentiate between RISC and CISC processors?
16. What do you mean by instruction code and operation code?
17. Briefly explain the instruction format?
18. Explain parallel processing in computer system?
19. Explain SISD,SIMD?
20. Explain MIMD,MISD?
21. Explain in brief Pipelining?
22. Describe instruction pipelining?
23. Define data hazards and timing variations?
24. Define branching,interrupts and data dependency?
25. Write down the advantage and disadvantage of pipelining concepts?
26. Explain various data dependency hazard in pipelining?
27. What is structural hazard of pipelining concept?
28. Describe the control hazards of pipelining system?
29. Explain the operand forwarding technique?
30. Differentiate between RAM and ROM?
31. Describe associative and auxiliary memory?
32. Describe main memory and cache memory in short?
33. What do you mean by hit ratio?

34. Briefly explain associative Mapping?
35. Briefly explain direct mapping?
36. Briefly explain Set Associative Mapping?
37. Explain the virtual memory concept in short?
38. Explain the CPU interface?
39. Explain the I/O interface?
40. Describe the programmed input output data transfer technique?
41. Describe the interrupt initiated data transfer method?
42. Describe the direct memory access data transfer mode?
43. Explain components of I/O processor in brief?
44. What is interrupt?
45. Describe priority interrupts?
46. Explain hardware interrupts briefly?
47. Explain software interrupts briefly?
48. Differentiate between maskable and non maskable interrupts?
49. Define synchronous mode of data transfer?
50. Define asynchronous mode of data transfer?

Section-C

Long answer type question

1. Explain the von neumann and harvard architecture of computer system?
2. What are the different components of computer systems?
3. Differentiate between computer architecture and computer organisation? Also explain the components in computer organisation?
4. What is computer register? Explain different types of computer registers?
5. Explain assembly and machine language in detail with example?
6. What do you mean by instruction and instruction code? Explain instruction format with diagram?
7. What is opcode and operand? Explain the 3-instruction code format?
8. Explain flynn's classification of computer system?
9. Explain the different instruction formats of system?
10. Explain various CPU organisation based on ALU operand?
11. Explain zero address, 1-address, 2-address instruction format in detail?
12. Explain different types of addressing modes.
13. Describe RISC and CISC? Give difference between RISC and CISC?
14. Explain instruction cycle with diagram?
15. Explain the memory hierarchy of computer system?
16. Write down different kind of ROM?
17. Explain different types of mapping techniques?
18. Briefly explain the categorisation of computer system based on data transfer modes?
19. Explain the pipelining processing concept?
20. What are the factors affecting the performance of pipelining?

21. Explain different hazards in pipelining?
22. What are the different data hazards?
23. Describe the various methods of handling data hazards in pipelined system?
24. What is unconditional branching in pipeline?
25. How delayed branching is used to minimise penalty occurred due to conditional branch instructions?
26. Differentiate between conditional and unconditional branching?
27. Explain the microprogram control unit design of computer?
28. Differentiate between horizontal and vertical microprogram microinstructions?
29. Explain three types operating modes of DMA?(Burst,cycle stealing,block).
30. Explain writeback updation technique of cache memory?
31. Explain write through updation technique of cache memory?
32. Explain three types of miss in cache memory?
33. Describe the two replacement algorithm of cache memory?
34. What do you mean by hit ratio,miss ratio,speedup,throughput, and efficiency?
35. Explain secondary memory?
36. Differentiate between constant track and variable track capacity?
37. Explain seek time,latency time,transfer time of secondary memory?
38. Explain multilevel cache memory working?
39. Explain true dependency,output dependency,and anti dependency?
40. Explain SISD,SIMD,MISD,MIMD?
41. Describe vector processors?Also write down its applications?
42. Explain the peripheral devices?
43. What do you mean by interface?Briefly explain two types of interfaces?
44. Describe input output subsystem of a computer?
45. Explain the different methods of data transfer techniques?
46. Describe DMA technique of transferring data with diagram?
47. Describe input output processor with block diagram?
48. Define interrupt?Explain priority interrupt with example?
49. Explain different types of interrupts?
50. Describe synchronous and asynchronous data transfer modes?

B.Sc. Computer Science Semester - II

Subject- Mathematics-II

1. Round off the number 75462 to four significant digits, then calculate the absolute error and percentage error.
2. Solve the equation $x^3-7x^2+36=0$ given that one root is double of another.
3. Find the root of equation $x^3-4x-9=0$ using bisection method correct to two decimal places?
4. Find cube root of 41 correct to three decimal places.
5. Find percentage error if 625.483 is approximated to three significant figures.
6. Find root of equation $x^3-4x-11=0$ using bisection method correct to two decimal places.
7. Find value of $1/31$ using Newton Raphson method correct to three decimal places.
8. Find the absolute and relative error if the number $X=0.0054582828$ is (a) truncated to three decimal digits (b) rounded off to three decimal digits
9. Find root of equation $x^3-2x-5=0$ using Newton's raphson method correct to two decimal places
10. Find root of equation $e^{-x}-x=0$ using Regula Falsi method correct to two decimal places.
11. Fit the curve $y=ae^{bx}$ to the following data

X	0	2	4
Y	5.1	10	31.1

12. The observation in the following table fit a law of the form $y=ax^n$. Estimate a and n by method of group average

X	10	20	30	40	50	60	70	80
Y	1.06	1.33	1.52	1.68	1.81	1.91	2.01	2.11

13. Fit a straight line by method of least square

X	1	2	3	4	5
Y	14	27	40	55	68

14. Fit a straight line of the form $y=a+bx$ to the following data by method of group averages

X	0	5	10	15	20	25
Y	12	15	17	22	24	30

15. Fit a straight line to the following data using method of least square

X	6	7	7	8	8	8	9	9	10
Y	5	5	4	5	4	3	4	3	3

16. Fit the least square curve of the form $y=a_0+a_1x^2$

X	-1	0	1	2
y	2	5	3	0

17. Fit a straight line of the form $y=a+bx$ using method of group average

x	0	5	10	15	20
y	12	15	17	22	24

18. Construct Newton's forward interpolation polynomial for the following data and evaluate y for $x=5$

x	4	6	8	10
y	1	3	8	16

19. Using Newton's divided difference formula evaluate $f(8)$

x	4	5	7	10	11	13
f(x)	48	100	294	900	1210	2028

20. Using Gauss forward formula evaluate $f(3.75)$ from the table

X	2.5	3.0	3.5	4.0	4.5	5.0
f(x)	24.145	22.043	20.225	18.644	17.262	16.047

21. Using Newton's forward formula, find the value of $f(1.6)$ if

X	1	1.4	1.8	2.2
F(x)	3.49	4.82	5.96	6.5

22. For given values evaluate $f(9)$ using Newton divided difference formula

X	5	7	11	13	17
Y	150	392	1452	2366	5202

23. Find $f(22)$ from following data using Newton's backward formula

X	20	25	30	35	40	45
F(x)	354	332	291	260	231	204

24. Find the polynomial $f(x)$ by using Lagrange's formula and find $f(3)$

X	0	1	2	5
Y	2	3	12	147

25. Find polynomial which takes following values using Newton's forward interpolation formula and calculate $f(4)$

x	0	1	2	3
f(x)	1	2	1	10

26. Find $y(25)$ from Gauss forward formula

x	20	24	28	32
y(x)	24	32	35	40

27. Find $f(3)$ using Lagrange's interpolation formula

X	0	1	2	5
f(x)	2	3	12	147

28. The result of measurement of electric resistance R of copper bar at various $t^{\circ}\text{C}$ are listed below

$t^{\circ}\text{C}$	19	25	30	36	40	45	50
R	76	77	79	80	82	83	85

Find the relation $R=a+bt$ by method of least square where a and b are constant

29. By method of group average fit a curve of the form $y=ae^{bx}$ to the following data

x	5	15	20	30	35	40
y	10	14	25	40	50	62

30. Convert following equations to linear form
 (a) $y=ax+bx^2$ (b) $y=b/[x(x-a)]$

31. Find $y'(0)$ from following data

X	0	1	2	3	4	5
Y	4	8	15	7	6	2

32. Write all newton-Cotes quadrature formulas

33. Evaluate $\int_1^4 e^x dx$ by simpson rule given that $e=2.72, e^2=7.39, e^3=20.09, e^4=54.6$

34. Evaluate $\int_0^1 1/(e^x+x) dx$ by Rombergs method upto three decimal places, find the value of $\log_e 2$

35. Find $f'(10)$ from following data

x	3	5	11	27	34
f(x)	-13	23	899	17315	35606

36. Evaluate $\int_1^6 x^2/(1-x^3) dx$ by simpson 1/3rd rule.

37. Evaluate $\int_0^1 1/(1-x) dx$ using Euler Maclaurin formula.

38. Find first and second derivatives of the function tabulated below, at the point $x=1.2$

x	1.0	1.2	1.4	1.6	1.8	2.0
f(x)	0	0.128	0.544	1.296	2.432	4.00

39. Evaluate $\int 1/(4x+5) dx$ by simpson 1/3rd rule.

40. Apply Euler-Maclaurin formula to evaluate $1/400+1/402+1/404+\dots\dots\dots 1/500$

41. Solve $y'=y^2+x, y(0)=1$ using Taylor series method and compute $y(0.1)$ and $y(0.2)$

42. Using modified Euler method find $y(0.2)$ given that $y'=x+y, y(0)=1$

43. Using Picards method solve $dy/dx = X+Y$ with $x_0=0, y_0=1$ upto fifth approximation.

44. Using fourth order runge kutta method find approximate solution at $x=0.1$ of the initial value problem $y'=x+y^2$ and $y(0)=1$

45. Find by Taylor's series method the values of y at $x=0.1$ and $x=0.2$ to three places of decimal from $dy/dx=x^2y-1, y(0)=1$

46. Given $dy/dx=(y-x)/(y+x)$ with initial condition $y=1$ at $x=0$ find y for $x=0.1$ by Eulers method.

47. Using fourth order runge kutta method $y(0.2)$ given that $dy/dx=3x+y/2, y(0)=1$ taking $h=0.1$

48. Using picard method solve $dy/dx= -xy$ with $x_0=0, y_0=1$ upto third approximation

49. Solve $dy/dx=1-y$ with initial condition $y=0$ at $x=0$ by modified Euler's method and obtain y at $x=0.1$ and 0.2

50. Find $y(0.1)$ and $y(0.2)$ using runge kutta method, given that $y'=x^2-y$ and $y(0)=1$

B.Sc. Computer Science Semester - II
Subject- Microprocessor and Assembly Language Programming
Section-A

Multiple choice/Very short type questions

1. What is full form of LEA
 - a) Load Effective Area
 - b) Load Effective Address
 - c) Load Effective Application
 - d) None of the above
2. What is the size of physical memory in 8086?
 - a) 1Mbytes
 - b) 2Mbytes
 - c) 1Kbytes
 - d) 2Kbytes
3. Size of instruction queue in 8086
 - a) 4
 - b) 8
 - c) 16
 - d) 6
4. What is the full form of INTA?
 - a) Interrupt Address
 - b) Interrupt Acknowledge
 - c) Both A & B
 - d) None of the above
5. In the register addressing mode, the data is stored in a
 - a) register
 - b) accumulator
 - c) Both of the above
 - d) None of the above
6. CALL & RET instructions belongs to which of the following section?
 - a) Data copy instructions
 - b) String instructions
 - c) Branch instructions
 - d) None of the above
7. What is full form of ORG?
 - a) Originator
 - b) Origin
 - c) Organization
 - d) None of the above
8. Intel introduced its first 4-bit microprocessor 4004 in
 - a) 1970
 - b) 1971
 - c) 1972
 - d) 1973
9. The 8086 microprocessor has a instruction set than 8085.
 - a) less powerful

- b) more powerful
 - c) Both of the above
 - d) None of the above
10. 8086 is a microprocessor.
- a) 4-bit
 - b) 8-bit
 - c) 16-bit
 - d) None of the above
11. Microprocessor is a/an _____ circuit that functions as the CPU of the computer.
- a) electronic
 - b) mechanic
 - c) integrated
 - d) None of the above
12. Microprocessor is the _____ of the computer and it performs all the computational tasks.
- a) memory
 - b) heart
 - c) task
 - d) None of the above
13. The Intel 8086 microprocessor is a _____ processor
- a) 8 bit
 - b) 16 bit
 - c) 32 bit
 - d) 4 bit
14. The 16 bit flag of 8086 microprocessor is responsible to indicate _____
- a) the condition of result of ALU operation
 - b) the condition of memory
 - c) the result of addition
 - d) the result of subtraction
15. A 20-bit address bus allows access to a memory of capacity
- a) 1 MB
 - b) 2 MB
 - c) 4 MB
 - d) 8 MB
16. In flag register, the CF is known as _____
- a) carry flag
 - b) condition flag
 - c) common flag
 - d) call flag
17. The SF is called as _____
- a) service flag
 - b) sign flag
 - c) single flag
 - d) condition flag
18. The OF is called as _____
- a) overflow flag
 - b) overdue flag

- c) one flag
 - d) over flag
19. The IF is called as _____
- a) initial flag
 - b) indicate flag
 - c) interrupt flag
 - d) inter flag
20. The register AX is formed by grouping _____
- a) AH & AL
 - b) BH & BL
 - c) CH & CL
 - d) DH & DL
21. The SP is indicated by _____
- a) single pointer
 - b) stack pointer
 - c) source pointer
 - d) destination pointer
22. The BP is indicated by _____
- a) base pointer
 - b) binary pointer
 - c) bit pointer
 - d) digital pointer
23. The SS is called as _____
- a) single stack
 - b) stack segment
 - c) sequence stack .
 - d) serial stack
24. The BIU prefetches the instruction from memory and store them in _____
- a) queue
 - b) register
 - c) memory
 - d) stack
25. In 8086, 1 Mbytes memory is physically organized as an odd bank and an even bank, each of which
- a) 10 Kbytes
 - b) 64 Kbytes
 - c) 33 Kbytes
 - d) 512 Kbytes
26. The DS is called as _____
- a) data segment
 - b) digital segment
 - c) divide segment
 - d) decode segment
27. The _____ translates a byte from one code to another code
- a) XLAT
 - b) XCHNG
 - c) POP
 - d) PUSH

28. The pin of minimum mode AD0-AD15 has _____ address
- 16 bit
 - 20 bit
 - 32 bit
 - 4 bit
29. The pin of minimum mode AD0- AD15 has _____ data bus
- 4 bit
 - 20 bit
 - 16 bit
 - 32 bit
30. _____ is used to write into memory
- RD
 - WR
 - RD / WR
 - CLK

Answer key: 1) b 2) a 3) d 4) b 5) a 6) c 7) b 8) b 9) b 10) c
 11) a 21) b 13) b 14) a 15) a 16) a 17) b 18) a 19) c 20) a
 21) b 22) a 23) b 24) a 25) d 26) a 27) a 28) b 29) c 30) b

Section-B

Short answer type questions

1. What is microprocessor?
2. What is the difference between microprocessor and a CPU?
3. Define Microcomputer.
4. What is microcontroller?
5. Explain the difference between a microprocessor and a microcontroller.
6. What is an assembler?
7. Define compiler.
8. Define interpreter.
9. Explain the difference between a compiler and an interpreter.
10. What is an ASCII code?
11. What is an operating system?
12. Explain these terms: SSI, MSI and LSI.
13. Define mnemonic.
14. What do you mean by system bus?
15. Define the term word length.
16. Define the term byte.
17. Define the term nibble.
18. What is manual or hand assembly?
19. Define the term mainframe.
20. Write the name of any two supercomputers.
21. What is monitor program?
22. Define the term machine language.

23. Define the term assembly language.
24. Define the term high-level language.
25. Explain Von Neumann architecture.
26. Explain Harvard architecture
27. From which address the 8086 starts execution after reset?
28. What is the maximum I/O addressing capability of 8086?
29. What was the reason for developing an 8-bit processor 8088 after the 8086, when a 16-bit processor had already been introduced?
30. Explain immediate addressing mode of 8086 with suitable example.
31. Explain direct addressing mode of 8086 with suitable example.
32. Explain register addressing mode of 8086 with suitable example.
33. Explain register indirect addressing mode of 8086 with suitable example.
34. Explain indexed addressing mode of 8086 with suitable example.
35. Explain register relative addressing mode of 8086 with suitable example.
36. Explain based indexed addressing mode of 8086 with suitable example.
37. Explain relative based indexed addressing mode of 8086 with suitable example.
38. Explain the physical address formation in direct addressing mode.
39. Explain the physical address formation in register indirect addressing mode.
40. Explain the physical address formation in register relative addressing mode.
41. Explain the physical address formation in based indexed addressing mode.
42. Explain the physical address formation in relative based indexed addressing mode.
43. Explain branch instructions of 8086 with suitable examples.
44. Explain flag manipulation & machine control instructions of 8086 with suitable example.
45. What are the assembler directives?
46. Explain any five assembler directives with suitable examples.
47. Explain the stack structure of 8086 in detail.
48. What is the role of stack in calling a subroutine and returning from the routine?
49. Explain the execution of CALL instruction.
50. What is interrupt?
51. Define interrupt service routine.
52. Explain the term 'nested interrupt'.
53. What is the difference between hardware and software interrupt?
54. What is the difference between a NEAR and FAR procedure?
55. Explain the term 'maskable interrupt'.
56. Explain the term 'non maskable interrupt'.
57. Write the full form of RISC.
58. Write the full form of CISC.

Section-C

Long answer type questions

1. Explain the function of each component of a computer.
2. Explain the difference between the machine language and the assembly language.
3. What are the advantages of an assembly language in comparison with high-level language?

4. Draw a block diagram of a microprocessor based system and explain the function of each component.
5. Draw a block diagram of a microprocessor controlled temperature system (MCTS) and explain the function of each component.
6. Explain the history of microprocessor.
7. How does the microprocessor work? Explain.
8. Explain the difference between Von Neumann and Harvard architecture.
9. Define RISC.
10. Define CISC.
11. Explain the feature of RISC.
12. Explain the feature of CISC.
13. Explain register organization of 8086.
14. Explain general data registers of 8086.
15. Explain segment registers of 8086.
16. Explain flag register of 8086.
17. Write the use of sign flag bit in 8086.
18. Write the use of zero flag bit in 8086.
19. Write the use of parity flag bit in 8086.
20. Write the use of carry flag bit in 8086.
21. Write the use of interrupt flag bit in 8086.
22. Write the use of direction flag bit in 8086.
23. Write the use of auxiliary carry flag bit in 8086.
24. Write the use of overflow flag bit in 8086.
25. What are the advantages of segmented memory scheme in 8086?
26. Explain the functions of the following signals of 8086:

(i) ALE	(ii) $\overline{DT}/\overline{R}$	(iii) \overline{DEN}	(iv) \overline{LOCK}	(v) \overline{TEST}
(vi) $\overline{MN}/\overline{M\overline{X}}$	(vii) \overline{BHE}	(viii) $\overline{M}/\overline{I\overline{O}}$	(ix) $\overline{RQ}/\overline{GT}$	(x) QS_0
(xi) READY	(xii) NMI	(xiii) INTR	(xiv) HOLD	(xv) HLDA
27. Explain the function of bus interface unit in 8086.
28. Draw and explain flag register of 8086 in brief.
29. Explain the concept of segmented memory?
30. Explain pin configuration of 8086.
31. Explain physical memory organization in an 8086 system.
32. Draw and discuss the general bus operation cycle of 8086.
33. Draw and discuss the read cycle timing diagram of 8086 in minimum mode.
34. Draw and discuss the write cycle timing diagram of 8086 in minimum mode.
35. Draw and discuss the read cycle timing diagram of 8086 in maximum mode.
36. Draw and discuss the write cycle timing diagram of 8086 in maximum mode.
37. Draw and explain the architecture diagram of 8088.
38. Explain pin diagram of 8088.
39. What are the architectural & signal differences between 8086 & 8088?
40. Explain machine language instruction formats of 8086/8088.
41. What do you mean by addressing mode? What are the different addressing modes supported by 8086? Explain each of them with suitable examples.
42. Explain the physical address formation in different addressing modes.

43. Explain the addressing modes for control transfer instructions.
44. What are the different instruction types of 8086?
45. Explain data copy/transfer instructions of 8086 with suitable examples.
46. Explain arithmetic & logical instructions of 8086 with suitable examples.
47. Explain the following assembler directives with suitable examples,
- | | | | |
|---------------|-----------------------------|-------------|---------------|
| (i) DB | (ii) END | (iii) DW | (iv) DQ |
| (v) DT | (vi) ASSUME | (vii) ENDS | (viii) EVEN |
| (ix) EQU | (x) EXTRN | (xi) LENGTH | (xii) LOCAL |
| (xiii) OFFSET | (xiv) ORG | (xv) PROC | (xvi) PUBLIC |
| (xvii) GLOBAL | (xviii) '+' & '-' Operators | | (xix) FAR PTR |
| (xx) NEAR PTR | | | |
48. Explain the following instructions of 8086:
- | | | | | |
|----------|-------------|----------|----------|----------|
| 1. PUSH | 2. POP | 3. XCHG | 4. IN | 5. OUT |
| 6. LEA | 7. ADD | 8. ADC | 9. INC | 10. DEC |
| 11. SUB | 12. SBB | 13. CMP | 14. NEG | 15. MUL |
| 16. IMUL | 17. DIV | 18. IDIV | 19. AND | 20. OR |
| 21. NOT | 22. SHL/SAL | 23. SHR | 24. SAR | 25. ROR |
| 26. ROL | 27. RCR | 28. RCL | 29. REP | 30. CMPS |
| 31. SCAS | 32. CALL | 33. RET | 34. INTO | 35. JMP |
| 36. IRET | 37. LOOP. | | | |
49. What is interrupt vector table of 8086? Explain its structure.
50. Explain the feature of intel i3 processor
51. Explain the feature of intel i5 processor.
52. Explain the feature of intel i7 processor.

B.Sc. Computer Science Semester - II
Subject- Object Oriented Programming using C & C++

Section-A

Multiple choice/Very short type question

1. Which of the following is not an OOP feature in C++?
 - a) Encapsulation
 - b) Abstraction
 - c) Polymorphism
 - d) Exceptions
2. If container classes are carefully constructed, then these tools are available to work with structures that are not
 - a) valid without container classes
 - b) programmer-defined
 - c) type-specific
 - d) public
3. To be called object-oriented, a programming language must allow:
 - a) functions that return values
 - b) Library of predefined functions
 - c) Inheritance
 - d) All of these
4. Which of the following statements is false?
 - a) A function is a block of code that performs a specific task
 - b) Functions allow programmers to break large and complex problems into small and manageable tasks
 - c) Functions allow programmers to use existing code to perform common tasks
 - d) Functions can be called, or invoked, only once in a program
5. A function that is called automatically each time an object is destroyed is a
 - a) Destructor
 - b) Destroyer
 - c) Remover
 - d) Terminator
6. Which of the following is not a type of constructor?
 - a) Copy Constructor
 - b) Friend Constructor
 - c) Default Constructor
 - d) Parameterized Constructor
7. Which of the following concepts means determining at runtime what method to invoke? *
 - a) Data hiding
 - b) Dynamic Typing
 - c) Dynamic binding
 - d) Dynamic Loading

8. Which of the following is a mechanism of static polymorphism?
 - a) Operator overloading
 - b) Function Overloading
 - c) Templates
 - d) All of the above
9. Which of the following approach is adapted by C++?
 - a) Top down
 - b) Bottom Up
 - c) Left right
 - d) Right Left
10. You can use C++ as a procedural, as well as an object-oriented, language
 - a) True
 - b) False
11. A default catch block catches
 - a) all thrown objects
 - b) no thrown objects
 - c) any thrown object that has not been caught by an earlier catch block
 - d) all thrown objects that have been caught by an earlier catch block
12. Adding a derived class to a base class requires fundamental changes to the base class
 - a) True
 - b) False
13. Format flags may be combined using
 - a) A.the bitwise OR operator (|)
 - b) B. the logical OR operator (||)
 - c) C. the bitwise AND operator (&)
 - d) D. the logical AND operator (&&)
14. The use of the break statement in a switch statement is
 - a) optional
 - b) compulsory
 - c) not allowed. It gives an error message
 - d) to check an error
15. To expose a data member to the program, you must declare the data member in the _____ section of the class
 - a) common
 - b) exposed
 - c) public
 - d) unrestricted
16. Which of the following are valid characters for a numeric literal constant?
 - a) a comma
 - b) a dollar sign (\$)
 - c) a percent sign (%)
 - d) None of the above

17. C++ program contains a function with the header `int function(double d, char c)`. Which of the following function headers could be used within the same program?
- a) `char function(double d, char c)`
 - b) `int function(int d, char c)`
 - c) both (a) and (b)
 - d) neither (a) nor (b)
18. When the compiler cannot differentiate between two overloaded constructors, they are called
- a) overloaded
 - b) destructed
 - c) ambiguous
 - d) dubious
19. Some Streams work with input, and some with output
- a) True
 - b) False
20. Which type of statement does not occur in computer programs?
- a) sequence
 - b) loop
 - c) denial
 - d) selection
21. The newline character is always included between
- a) pair of parentheses
 - b) pair of curly braces
 - c) control string
 - d) None of the above
22. To be called object-oriented, a programming language must allow
- a) functions that return only a single value
 - b) `#include` files
 - c) inheritance
 - d) All of the above
23. A function that returns no values to the program that calls it is _____
- a) not allowed in C++
 - b) type void
 - c) type empty
 - d) type barren
24. The keyword used to define a structure is _____
- a) `stru`
 - b) `stt`
 - c) `struct`
 - d) `structure`
25. When a child class function is called, the compiler looks first for a matching function name in the _____

- a) class of the object using the function name
 - b) immediate ancestor class
 - c) base class
 - d) descendant class
26. Which of the following statements allows the user to enter data at the keyboard?
- a) `cin << currentPay;`
 - b) `cin >> currentPay;`
 - c) `cout << currentPay;`
 - d) `cout >> currentPay;`
 - e) None of the above
27. When you pass a variable _____, C++ passes only the contents of the variable to the receiving function
- a) by reference
 - b) by value
 - c) globally
 - d) locally
28. To enter a comment in a C++ program, you begin the comment with _____
- a) `**`
 - b) `&&`
 - c) `\`
 - d) `@`
 - e) `//`
29. Which of the following is(are) invalid string constant(s)?
- a) `'7.15 pm'`
 - b) `"i like e"`
 - c) `"7.3e12"`
 - d) `"1234e12"`
30. Overloaded functions are required to
- a) have the same return type
 - b) have the same number of parameters
 - c) perform the same basic functions
 - d) D.None of the above
31. You mark the beginning of a function's block of code with the _____
- a) `/`
 - b) `*`
 - c) `{`
 - d) `}`
32. Which of the following statements is correct?
- a) Base class pointer cannot point to derived class.
 - b) Derived class pointer cannot point to base class.
 - c) Pointer to derived class cannot be created.
 - d) Pointer to base class cannot be created.

33. Which of the following is not the member of class?
- a) Static function
 - b) Friend function
 - c) Const function
 - d) Virtual function
34. Which of the following concepts means determining at runtime what method to invoke?
- a) Data hiding
 - b) Dynamic Typing
 - c) Dynamic binding
 - d) Dynamic loading
35. Which of the following term is used for a function defined inside a class?
- a) Member Variable
 - b) Member function
 - c) Class function
 - d) Classic function
36. Which of the following concept of oops allows compiler to insert arguments in a function call if it is not specified?
- a) Call by value
 - b) Call by reference
 - c) Default arguments
 - d) Call by pointer
37. How many instances of an abstract class can be created?
- a) 1
 - b) 5
 - c) infinite
 - d) 0
38. Which of the following cannot be friend?
- a) Function
 - b) Class
 - c) Object
 - d) Operator function
39. Why reference is not same as a pointer?
- a) A reference can never be null.
 - b) A reference once established cannot be changed.
 - c) Reference doesn't need an explicit dereferencing mechanism.
 - d) All of the above.
40. cout is a/an _____ .
- a) operator
 - b) function
 - c) object
 - d) macro

41. Which of the following concepts provides facility of using object of one class inside another class?
- a) Encapsulation
 - b) Abstraction
 - c) Composition
 - d) Inheritance
42. How many types of polymorphisms are supported by C++?
- a) 1
 - b) 2
 - c) 3
 - d) 4
43. Which of the following statement is correct?
- a) A constructor is called at the time of declaration of an object.
 - b) A constructor is called at the time of use of an object.
 - c) A constructor is called at the time of declaration of a class.
 - d) A constructor is called at the time of use of a class.
44. Which of the following is correct about function overloading?
- a) The types of arguments are different.
 - b) The order of argument is different.
 - c) The number of argument is same.
 - d) Both A and B.
45. Which of the following is correct about class and structure?
- a) class can have member functions while structure cannot.
 - b) class data members are public by default while that of structure are private.
 - c) Pointer to structure or classes cannot be declared.
 - d) class data members are private by default while that of structure are public by default.
46. Which of the following concepts means wrapping up of data and functions together?
- a) Abstraction
 - b) Encapsulation
 - c) Inheritance
 - d) Polymorphism
47. Which of the following concepts means waiting until runtime to determine which function to call?
- a) Data hiding
 - b) Dynamic casting
 - c) Dynamic binding
 - d) Dynamic loading
48. Which of the following operator is overloaded for object cout?
- a) >>
 - b) <<
 - c) +

- d) =
49. Which of the following is the correct class of the object cout?
- a) ostream
 - b) istream
 - c) ostream
 - d) ifstream
50. Which of the following cannot be used with the keyword virtual?
- a) class
 - b) member functions
 - c) constructor
 - d) destructor
51. Which of the following functions are performed by a constructor?
- a) Construct a new class
 - b) Construct a new object
 - c) Construct a new function
 - d) Initialize objects
52. Which of the following problem causes an exception?
- a) Missing semicolon in statement in main().
 - b) A problem in calling function.
 - c) A syntax error.
 - d) A run-time error
53. Which of the following is the correct way of declaring a function as constant?
- a) `const int ShowData(void) { /* statements */ }`
 - b) `int const ShowData(void) { /* statements */ }`
 - c) `int ShowData(void) const { /* statements */ }`
 - d) Both A and B
54. Which of the following concepts is used to implement late binding?
- a) Virtual function
 - b) Operator function
 - c) Const function
 - d) Static function
55. Which of the following statement is correct?
- a) C++ allows static type checking.
 - b) C++ allows dynamic type checking.
 - c) C++ allows static member function be of type const.
 - d) Both A and B.
56. Which of the following ways are legal to access a class data member using this pointer?
- a) `this->x`
 - b) `this.x`
 - c) `*this.x`
 - d) `*this-x`

57. What happens if the base and derived class contains definition of a function with same prototype?
- a) Compiler reports an error on compilation.
 - b) Only base class function will get called irrespective of object.
 - c) Only derived class function will get called irrespective of object.
 - d) Base class object will call base class function and derived class object will call derived class function.
58. Which of the following is not a type of inheritance?
- a) Multiple
 - b) Multilevel
 - c) Distributive
 - d) Hierarchical
59. Which of the following operators cannot be overloaded?
- a) []
 - b) ->
 - c) ?:
 - d) *
60. Which of the following statements regarding inline functions is correct?
- a) It speeds up execution.
 - b) It slows down execution.
 - c) It increases the code size.
 - d) Both A and C.
61. Which one of the following is the correct way to declare a pure virtual function?
- a) `virtual void Display(void){0};`
 - b) `virtual void Display = 0;`
 - c) `virtual void Display(void) = 0;`
 - d) `void Display(void) = 0;`
62. Which of the following header file includes definition of cin and cout?
- a) `istream.h`
 - b) `ostream.h`
 - c) `iomanip.h`
 - d) `iostream.h`
63. Which of the following keyword is used to overload an operator?
- a) `overload`
 - b) `operator`
 - c) `friend`
 - d) `override`
64. What will happen if a class is not having any name?
- a) It cannot have a destructor.
 - b) It cannot have a constructor.
 - c) It is not allowed.
 - d) Both A and B.

65. Which inheritance type is used in the class given below?
class A : public X, public Y
{ }
- a) Multilevel inheritance
 - b) Multiple inheritance
 - c) Hybrid inheritance
 - d) Hierarchical Inheritance
66. Which of the following is an invalid visibility label while inheriting a class?
- a) public
 - b) private
 - c) protected
 - d) friend
67. Which one of the following options is correct?
- a) Friend function can access public data members of the class.
 - b) Friend function can access protected data members of the class.
 - c) Friend function can access private data members of the class.
 - d) All of the above.
68. Which of the following statements is correct in C++?
- a) Classes cannot have data as protected members.
 - b) Structures can have functions as members.
 - c) Class members are public by default.
 - d) Structure members are private by default.
69. Which of the following is used to make an abstract class?
- a) Declaring it abstract using static keyword.
 - b) Declaring it abstract using virtual keyword.
 - c) Making at least one member function as virtual function.
 - d) Making at least one member function as pure virtual function.
70. Which of the following access specifier is used as a default in a class definition?
- a) protected
 - b) public
 - c) private
 - d) friend
71. What is correct about the static data member of a class?
- a) A static member function can access only static data members of a class.
 - b) A static data member is shared among all the object of the class.
 - c) A static data member can be accessed directly from main().
 - d) Both A and B.
72. Which of the following provides a reuse mechanism?
- a) Abstraction
 - b) Inheritance
 - c) Dynamic binding
 - d) Encapsulation

73. Which of the following statements is correct?

1-Once a reference variable has been defined to refer to a particular variable it can refer to any other variable.

2-A reference is not a constant pointer.

- a) Only 1 is correct.
- b) Only 2 is correct.
- c) Both 1 and 2 are correct.
- d) Both 1 and 2 are incorrect.

74. Which of the following statements is correct?

1-Change a reference changes the referent.

2-We can create an array of references.

- a) Only 1 is correct.
- b) Only 2 is correct.
- c) Both 1 and 2 are correct.
- d) Both 1 and 2 are incorrect.

75. A reference is declared using the _____ symbol.

- a) &&
- b) &
- c) ||
- d) !

76. Which of the following statement is correct?

- a) Once a reference variable has been defined to refer to a particular variable it can refer to any other variable.
- b) A reference is indicated by using && operator.
- c) Once a reference variable has been defined to refer to a particular variable it cannot refer to any other variable.
- d) A reference can be declared beforehand and initialized later.

77. Which of the following statement is correct?

- a) A referenced has to be de-referenced to access a value.
- b) A referenced does not need to be de-referenced to access a value.
- c) A referenced has to be double de-referenced to access a value.
- d) Whether a reference should be de-referenced or not depends on the type of the reference.

78. Which of the following statements is correct?

1-Once the variable and the reference are linked they are tied together.

2-Once the reference of a variable is declared another reference of that variable is not allowed.

- a) Only 1 is correct.
- b) Only 2 is correct.
- c) Both 1 and 2 are correct.
- d) Both 1 and 2 are incorrect.

79. Reference is like a _____.

- a) Pointer
 - b) Structure
 - c) Macro
 - d) Enum
80. A constructor that accepts _____ parameters is called the default constructor.
- a) one
 - b) two
 - c) no
 - d) three
81. What happens when a class with parameterized constructors and having no default constructor is used in a program and we create an object that needs a zero-argument constructor?
- a) Compile-time error.
 - b) Preprocessing error.
 - c) Runtime error.
 - d) Runtime exception.
82. Destructor has the same name as the constructor and it is preceded by _____ .
- a) !
 - b) ?
 - c) ~
 - d) \$
83. Which constructor function is designed to copy objects of the same class type?
- a) Create constructor
 - b) Object constructor
 - c) Dynamic constructor
 - d) Copy constructor
84. Which of the following statement is correct?
- a) Constructor has the same name as that of the class.
 - b) Destructor has the same name as that of the class with a tilde symbol at the beginning.
 - c) Both A and B.
 - d) Destructor has the same name as the first member function of the class.
85. Which of the following statement is incorrect?
- a) Constructor is a member function of the class.
 - b) The compiler always provides a zero argument constructor.
 - c) It is necessary that a constructor in a class should always be public.
 - d) Both B and C.
86. Copy constructor must receive its arguments by _____ .
- a) either pass-by-value or pass-by-reference
 - b) only pass-by-value
 - c) only pass-by-reference
 - d) only pass by address

87. A function with the same name as the class, but preceded with a tilde character (~) is called _____ of that class.
- a) constructor
 - b) destructor
 - c) function
 - d) object
88. Which of the following gets called when an object goes out of scope?
- a) constructor
 - b) destructor
 - c) main
 - d) virtual function
89. Which of the following statement is correct?
- a) Destructor destroys only integer data members of the object.
 - b) Destructor destroys only float data members of the object.
 - c) Destructor destroys only pointer data members of the object.
 - d) Destructor destroys the complete object.
90. _____ used to make a copy of one class object from another class object of the same _____ class type.
- a) constructor
 - b) copy constructor
 - c) destructor
 - d) default constructor
91. Constructors _____ to allow different approaches of object construction.
- a) cannot overloaded
 - b) can be overloaded
 - c) can be called
 - d) can be nested
92. If the programmer does not explicitly provide a destructor, then which of the following creates an empty destructor?
- a) Preprocessor
 - b) Compiler
 - c) Linker
 - d) main() function
93. How many default constructors per class are possible?
- a) Only one
 - b) Two
 - c) Three
 - d) Unlimited
94. Which of the following statement is correct about destructors?
- a) A destructor has void return type.
 - b) A destructor has integer return type.
 - c) A destructor has no return type.

- d) A destructors return type is always same as that of main().
95. A destructor takes _____ arguments.
- a) one
 - b) two
 - c) three
 - d) no
96. Destructor calls are made in which order of the corresponding constructor calls?
- a) Reverse order
 - b) Forward order
 - c) Depends on how the object is constructed
 - d) Depends on how many objects are constructed
97. Which of the following never requires any arguments?
- a) Member function
 - b) Friend function
 - c) Default constructor
 - d) const function
98. A class's _____ is called when an object is destroyed.
- a) constructor
 - b) destructor
 - c) assignment function
 - d) copy constructor
99. How many times a constructor is called in the life-time of an object?
- a) Only once
 - b) Twice
 - c) Thrice
 - d) Depends on the way of creation of object
100. Which of the following gets called when an object is being created?
- a) constructor
 - b) virtual function
 - c) destructor
 - d) main
101. Which of the following statement is correct about constructors?
- a) A constructor has a return type.
 - b) A constructor cannot contain a function call.
 - c) A constructor has no return type.
 - d) A constructor has a void return type.
102. Which of the following statement is correct?
- a) C++ enables to define functions that take constants as an argument.
 - b) We cannot change the argument of the function that that are declared as constant.
 - c) Both A and B.
 - d) We cannot use the constant while defining the function.
103. Which of the following statement is correct?

- a) Overloaded functions can have at most one default argument.
 - b) An overloaded function cannot have default argument.
 - c) All arguments of an overloaded function can be default.
 - d) A function if overloaded more than once cannot have default argument.
104. Which of the following statement is correct?
- a) Two functions having same number of argument, order and type of argument can be overloaded if both functions do not have any default argument.
 - b) Overloaded function must have default arguments.
 - c) Overloaded function must have default arguments starting from the left of argument list.
 - d) A function can be overloaded more than once.
105. Which of the following statement will be correct if the function has three arguments passed to it?
- a) The trailing argument will be the default argument.
 - b) The first argument will be the default argument.
 - c) The middle argument will be the default argument.
 - d) All the argument will be the default argument.
106. Which of the following statement is incorrect?
- a) Default arguments can be provided for pointers to functions.
 - b) A function can have all its arguments as default.
 - c) Default argument cannot be provided for pointers to functions.
 - d) A default argument cannot be redefined in later declaration.
107. Which of the following function / type of function cannot be overloaded?
- a) Member function
 - b) Static function
 - c) Virtual function
 - d) Both B and C
108. Which of the following function declaration is/are incorrect?
- a) `int Sum(int a, int b = 2, int c = 3);`
 - b) `int Sum(int a = 5, int b);`
 - c) `int Sum(int a = 0, int b, int c = 3);`
 - d) Both B and C are incorrect.
 - e) All are correct.
109. Which of the following statement is correct?
- a) Only one parameter of a function can be a default parameter.
 - b) Minimum one parameter of a function must be a default parameter.
 - c) All the parameters of a function can be default parameters.
 - d) No parameter of a function can be default.
110. Which of the following statement is incorrect?
- a) A default argument is checked for type at the time of declaration and evaluated at the time of call.

- b) We can provide a default value to a particular argument in the middle of an argument list.
 - c) We cannot provide a default value to a particular argument in the middle of an argument list.
 - d) Default arguments are useful in situations where some arguments always have the same value.
111. Which of the following statement is correct?
- a) Overloaded functions can accept same number of arguments.
 - b) Overloaded functions always return value of same data type.
 - c) Overloaded functions can accept only same number and same type of arguments.
 - d) Overloaded functions can accept only different number and different type of arguments.
112. Which of the following function / types of function cannot have default parameters?
- a) Member function of class
 - b) main()
 - c) Member function of structure
 - d) Both B and C
113. Which of the following statement is correct?
- a) The order of the default argument will be right to left.
 - b) The order of the default argument will be left to right.
 - c) The order of the default argument will be alternate.
 - d) The order of the default argument will be random.
114. Which of the following statements is incorrect?
- a) Friend keyword can be used in the class to allow access to another class.
 - b) Friend keyword can be used for a function in the public section of a class.
 - c) Friend keyword can be used for a function in the private section of a class.
 - d) Friend keyword can be used on main().
115. Which of the following statement is correct regarding destructor of base class?
- a) Destructor of base class should always be static.
 - b) Destructor of base class should always be virtual.
 - c) Destructor of base class should not be virtual.
 - d) Destructor of base class should always be private.
116. Which of the following two entities (reading from Left to Right) can be connected by the dot operator?
- a) A class member and a class object.
 - b) A class object and a class.
 - c) A class and a member of that class.
 - d) A class object and a member of that class.
117. How can we make a class abstract?
- a) By making all member functions constant.
 - b) By making at least one member function as pure virtual function.
 - c) By declaring it abstract using the static keyword.

- d) By declaring it abstract using the virtual keyword.
118. Which of the following statements is correct when a class is inherited publicly?
- a) Public members of the base class become protected members of derived class.
 - b) Public members of the base class become private members of derived class.
 - c) Private members of the base class become protected members of derived class.
 - d) Public members of the base class become public members of derived class.
119. Which of the following statements is correct about the constructors and destructors?
- a) Destructors can take arguments but constructors cannot.
 - b) Constructors can take arguments but destructors cannot.
 - c) Destructors can be overloaded but constructors cannot be overloaded.
 - d) Constructors and destructors can both return a value.
120. Which of the following statement is correct with respect to the use of friend keyword inside a class?
- a) A private data member can be declared as a friend.
 - b) A class may be declared as a friend.
 - c) An object may be declared as a friend.
 - d) We can use friend keyword as a class name.
121. Which of the following can access private data members or member functions of a class?
- a) Any function in the program.
 - b) All global functions in the program.
 - c) Any member function of that class.
 - d) Only public member functions of that class.
122. Which of the following type of data member can be shared by all instances of its class?
- a) Public
 - b) Inherited
 - c) Static
 - d) Friend
123. Which of the following also known as an instance of a class?
- a) Friend Functions
 - b) Object
 - c) Member Functions
 - d) Member Variables
124. Which of the following statements about virtual base classes is correct?
- a) It is used to provide multiple inheritance.
 - b) It is used to avoid multiple copies of base class in derived class.
 - c) It is used to allow multiple copies of base class in a derived class.
 - d) It allows private members of the base class to be inherited in the derived class.
125. Which of the following statements is correct when a class is inherited privately?
- a) Public members of the base class become protected members of derived class.
 - b) Public members of the base class become private members of derived class.
 - c) Private members of the base class become private members of derived class.

- d) Public members of the base class become public members of derived class.
126. Which of the following statements is correct?
- a) Data items in a class must be private.
 - b) Both data and functions can be either private or public.
 - c) Member functions of a class must be private.
 - d) Constructor of a class cannot be private.
127. Which of the following can be overloaded?
- a) Object
 - b) Functions
 - c) Operators
 - d) Both B and C
128. Which of the following means "The use of an object of one class in definition of another class"?
- a) Encapsulation
 - b) Inheritance
 - c) Composition
 - d) Abstraction

Answer:- 1.d 2.c 3.c 4.a 5.a 6.b 7.c 8.d 9.b 10.a 11.c 12.b 13.a 14.a 15.c 16.d 17.b 18.c 19.a 20.c 21.c 22.c 23.b 24.c 25.a 26.b 27.b 28.c 29.a 30.d 31.c 32.b 33.b 34.c 35.b 36.c 37.d 38.c 39.d 40.c 41.c 42.b 43.a 44.d 45.d 46.b 47.c 48.b 49.c 50.d 51.d 52.d 53.c 54.a 55.d 56.a 57.d 58.c 59. 60.d 61.c 62.d 63.b 64.d 65.b 66.d 67.d 68.b 69.d 70.c 71.d 72.b 73.a 74.a 75.b 76.c 77.b 78.a 79.c 80.c 81.c 82.c 83.d 84. 85.c 86.c 87.b 88.b 89.d 90.b 91.b 92.b 93.a 94.c 95.d 96.a 97.c 98.b 99.a 100.a 101.c 102.c 103.c 104.d 105.a 106.a 107.c 108.a 109.c 110.b 111.d 112.b 113.a 114.d 115.b 116.d 117.b 118.d 119.b 120.b 121.c 122.c 123.b 124.b 125.b 126.b 127.d 128.c

Section-B

Short answer type questions

1. What are the Basic concepts of OOS?
2. Write any four features of OOPS.
3. What is object?
4. Define class.
5. Write the general syntax to create a class.
6. Give any four advantages of OOPS.
7. Give any four applications of OOPS.
8. Give any four applications of C++.
9. Define tokens.
10. Write the name of different types of token.\
11. What is binding?
12. What is data hiding?
13. What is late binding?
14. What kind of thing become object in OOP?
15. What are major drawbacks of procedure oriented programming?
16. What is abstraction?
17. What is dynamic polymorphism?
18. Difference between object based and object oriented programming languages.
19. Write the name of class member visibility modifier.
20. Write disadvantage (any two) of procedure oriented programming
21. What is header file? What is the purpose of iostream header file?
22. Write the structure of C++ program.
23. Explain types of token in short.
24. What is storage class?
25. Write the hierarchy of C++ data types.
26. Write the purpose of different storage class.
27. Write syntax to create union and enumeration.
28. Write any three differences between structure and union.
29. What are the rules of identifier?
30. Differentiate between auto and static Storage Classes
31. What is operator? Explain increment and decrement Operator.
32. What is Reference variable?
33. Write the syntax of switch statement.
34. What are the rules for Integral Constants?
35. What are the rules for Real Constants?
36. Explain extern and register Storage Classes
37. Explain Scope resolution operator
38. What is array? Describe two dimensional arrays.
39. Write the syntax of ladder if-else.
40. What is keyword?
41. Rules for naming the identifiers in C++.
42. What is a scope resolution operator?
43. What are symbolic constants?
44. What do you mean by dynamic initialization of variables?
45. What are reference variable?
46. What is member-dereferencing operator?

47. What is function prototype?
48. What is an inline function?
49. Write some situations where inline expansion may not work.
50. What is a default argument?
51. What are the constant arguments?
52. What is call- by- reference?
53. What is an encapsulation?
54. What is static data member?
55. What is function overloading?
56. Explain Object oriented programming.
57. What is function prototype in C++?
58. What are the ways to comment statement in C++?
59. Explain typecasting.
60. Define void pointer using C++.
61. When do you use :: Operator in C++?
62. Define reference variable in C++.
63. What is const qualifier?
64. When do you use bool data type?
65. What is function overloading in C++?
66. Define Inline Function.
67. When do you use this pointer?
68. What is new and delete operator?
69. Define namespace in C++.
70. Explain friend class in C++.
71. Define abstraction.
72. What is overriding?
73. What is private, public and protected Inheritance?
74. Define parameterized constructor.
75. Define copy constructor.
76. Define dynamic constructor.
77. Define const object.
78. Define destructor.
79. Write some special characteristics of constructor.
80. What is operator overloading in C++?
81. Define default constructor.
82. Is it possible to overload a constructor? How.
83. Difference between Overriding vs. overloading.
84. List out the operators that cannot be overloaded.
85. What is the purpose of using operator function? Write its syntax.
86. Write at least four rules for Operator overloading.
87. How will you overload Unary & Binary operator using member functions?
88. How will you overload Unary and Binary operator using Friend functions?
89. How an overloaded operator can be invoked using member functions?
90. How an overloaded operator can be invoked using Friend functions?
91. List out the operators that cannot be overloaded using Friend function.
92. What is operator overloading?
93. What is meant by casting operator and write the general form of overloaded casting operator?

94. What is overloaded function selection algorithm?
95. What is meant by pointer operators?
96. What is a template?
97. What is namespace?
98. What is the difference between type name and class?
99. What is the difference between throwing exceptions inside the function and outside the function?
100. When do we need multiple catch blocks for a single try block? Give an example.
101. What is rethrow()?
102. What is uncaught exception() function and why do we need it?
103. What are the disadvantages of the exception handling mechanism?
104. What is meant by inheritance?
105. What is meant by single inheritance?
106. What is multiple inheritances?
107. What is hierarchical inheritance?
108. What is multilevel inheritance?
109. What is hybrid inheritance?
110. What is meant by Abstract base class?
111. Write short notes on virtual base class.
112. What are Friend functions? Write the syntax
113. Write some properties of friend functions.
114. What are the virtual functions?
115. Write some of the basic rules for virtual functions
116. What are pure virtual functions? Write the syntax.
117. What is an Exception?
118. What is public, protected and private?
119. What are virtual functions?
120. What is friend function?
121. What do you mean by inheritance?
122. What is abstraction?
123. What is polymorphism? Explain with an example.
124. What is virtual class and friend class?
125. What do you mean by inline function?
126. When is an object created and what is its lifetime?
127. What do you mean by multiple inheritance and multilevel inheritance? Differentiate between them.
128. What are the main differences between procedure oriented languages and object oriented languages?
129. Why do we use virtual functions?
130. What do you mean by pure virtual functions?
131. What are the advantages of inheritance?
132. When is a memory allocated to a class?
133. What is the difference between declaration and definition?
134. In c++ there is only virtual destructors, no constructors. Why?
135. What is late bound function call and early bound function call? Differentiate.
136. What is Dynamic Polymorphism?
137. Write a macro for swapping integers.
138. What are streams? Why they are useful?

139. What are input and output streams?
140. What is the difference between a text file and a binary file?
141. What is a file pointer?
142. Write the syntax and use of getline () and write () functions.
143. What are the differences between manipulators and ios functions?
144. What is std namespace? How it is different from other namespaces?
145. Difference between get (), put ().
146. What is a file pointer?
147. What is an error and error handling functions?
148. How will you create manipulators?
149. Write the syntax and use of getline () and write () functions.
150. Give two types of template.
151. Define try and catch.
152. Define Exception handling.
153. Define File modes.

Section-C

Long answer type questions

1. What is constructor? Illustrate constructor overloading with program?
2. Explain friend function with program.
3. Explain new and delete operator with program.
4. What is abstract class also explain the need of abstract class?
5. Explain inline function with program?
6. What is function overloading explain with program?
7. Explain multiple inheritances with example?
8. What is overriding explain with example?
9. Explain multilevel and multiple inheritance with example?
10. What do you understand by pure virtual function explain with example?
11. What is function? Write a simple program to demonstrate the function overloading.
12. Write a simple program to demonstrate different ways of defining member function.
13. What is static member? Explain their use with simple program.
14. Write a program to overload “+” operator using friend function.
15. Write a simple program to demonstrate constructor with default arguments.
16. Explain hybrid and single inheritances with simple example.
17. What is dynamic polymorphism? Demonstrate its use with simple program.
18. What is virtual base class? Explain it’s important through simple example.
19. Write a program to demonstrate the use of any two formatted and unformatted I/O function.
20. Explain with the Basic Concepts of object oriented programming.
21. What are the difference between reference variables and normal variables with suitable program?
22. Explain about call-by-reference and return by reference with suitable program.
23. Describe the advantages of OOP.
24. What are the difference between pointers to constants and constant to pointers?
25. What is function overloading? Explain with an example program.
26. Explain the merits and demerits of object oriented methodology.

27. What is friend function? What is the use of friend functions in c++? Explain with a program.
28. What is polymorphism? Write a program to explain it.
29. Describe Abstract base class. Write a program to explain it.
30. What are the advantages of using default arguments? Explain with an example program.
31. Write a program to implement nested classes using c++.
32. Write a program to demonstrate how a static data is accessed by a static member function.
33. Write a program to get the student details and print the same using pointers to objects and pointers to members of a class. Create a class student and use appropriate functions and data members.
34. Explain copy constructor and destructor with suitable program.
35. Explain about static member and this pointer with suitable code.
36. Explain about Unary Operator and Binary Operator Overloading with program.
37. Define a supplier class. Assume that the items supplied by any given supplier are different and varying in number. Use dynamic memory allocation in the constructor function to achieve the solution.
38. What is uncaught exception function? Give an example.
39. How to use multiple catch functions inside a program? Explain with a program.
40. Write all blocks of exception handling? Explain with a program.
41. What are the virtual functions? Explain their needs using a suitable example. What are the rules associated with virtual functions?
42. What are the different forms of inheritance supported in c++? Discuss on the visibility of base class members in privately and publicly inherited classes.
43. What are abstract classes? Give an example (with the program) to illustrate the use of abstract classes.
44. Write notes on Typing conversions and derived class with program.
45. Explain about Exceptions Handlers and Standard Exceptions.
46. Discuss about Streams and stream classes
47. Write notes on Formatted and Unformatted Console I/O Operations.
48. Explain about File Pointers and Manipulations with example.
49. Discuss about manipulators and file streams with Program.
50. Write on Details about File modes and File I/O.
51. Write notes on Formatted and Unformatted Console I/O Operations.
52. Give the differences between Manipulators and ios Functions.

B.Sc. Computer Science Semester - IV

Subject - Introduction to Java

Section-A

Multiple choice/Very short type questions

1. Which is a valid keyword in java?
 - a) interface
 - b) string
 - c) float
 - d) unsigned
2. Which one of the following will declare an array and initialize it with five numbers?
 - a) `Array a = new Array(5);`
 - b) `int [] a = {23,22,21,20,19};`
 - c) `int a [] = new int[5];`
 - d) `int [5] array;`
3. Which is the valid declarations within an interface definition?
 - a) `public double methoda();`
 - b) `public final double methoda();`
 - c) `static void methoda(double d1);`
 - d) `protected void methoda(double d1);`
4. Which one is a valid declaration of a boolean?
 - a) `boolean b1 = 0;`
 - b) `boolean b2 = 'false';`
 - c) `boolean b3 = false;`
 - d) `boolean b4 = Boolean.false();`
 - e) `boolean b5 = no;`
5. What is the numerical range of a char?
 - a) -128 to 127
 - b) $-(2^{15})$ to $(2^{15}) - 1$
 - c) 0 to 32767
 - d) 0 to 65535
6. What will be the output of the program?

```
public class Foo
{
    public static void main(String[] args)
    {
        try
        {
            return;
        }
        finally
        {
            System.out.println( "Finally" );
        }
    }
}
```

}

- a) Finally
- b) Compilation fails.
- c) The code runs with no output.
- d) An exception is thrown at runtime.

Ans:A

7. Which is true about an anonymous inner class?

- a) It can extend exactly one class and implement exactly one interface.
- b) It can extend exactly one class and can implement multiple interfaces.
- c) It can extend exactly one class or implement exactly one interface.
- d) It can implement multiple interfaces regardless of whether it also extends a class.

8. Which is true about a method-local inner class?

- a) It must be marked final.
- b) It can be marked abstract.
- c) It can be marked public.
- d) It can be marked static.

9. Which class cannot be subclassed (or extended) in java?

- a) abstract class
- b) parent class
- c) Final class
- d) None of above

10. Why we use array as a parameter of main method?

- a) it is syntax
- b) Can store multiple values
- c) Both of above
- d) None of above

11. Suspend thread can be revived by using

- a) start() method
- b) Suspend() method
- c) resume() method
- d) yield() method

12. Runnable is

- a) Class
- b) Method
- c) Variable
- d) Interface

13. What is the value of "d" after this line of code has been executed?

```
double d = Math.round ( 2.5 + Math.random() );
```

- a) 2
- b) 3
- c) 4
- d) 2.5

14. Which of the following would compile without error?

- a) `int a = Math.abs(-5);`
- b) `int b = Math.abs(5.0);`
- c) `int c = Math.abs(5.5F);`

- d) `int d = Math.abs(5L);`
15. Which interface does `java.util.Hashtable` implement?
- a) `Java.util.Map`
 - b) `Java.util.List`
 - c) `Java.util.HashTable`
 - d) `Java.util.Collection`
16. Which is valid declaration of a float?
- a) `float f = 1F;`
 - b) `float f = 1.0;`
 - c) `float f = "1";`
 - d) `float f = 1.0d;`
17. Which of these operators is used to allocate memory to array variable in Java?
- a) `malloc`
 - b) `new malloc`
 - c) `new`
 - d) `calloc`
18. Which method executes only once?
- a) `start()`
 - b) `stop()`
 - c) `init()`
 - d) `destroy()`
19. Which of these is not a bitwise operator?
- a) `&`
 - b) `&=`
 - c) `|=`
 - d) `<=`
20. Which operator is used to invert all the digits in binary representation of a number?
- a) `~`
 - b) `<<<`
 - c) `>>>`
 - d) `^`
21. How can you stop the `finally()` block from executing, after try-catch block execution?
- a) by calling return statement from try or catch block
 - b) by calling `System.exit` from try or catch block
 - c) by Both return and `System.exit`
 - d) None of the above
22. Which of the following is not an exception in Java?
- a) `Nullpointer Exception`
 - b) `Arithmetic Exception`
 - c) `ArrayoutofBounds Exception`
 - d) `Logical Exception`
23. Which of the following is not a primitive data types?
- a) `Byte.`
 - b) `String.`
 - c) `Integer.`
 - d) `Float.`
24. Object is an _____ of a class

- a) Instance.
 - b) Implement.
 - c) Inheritance.
 - d) Invoke.
25. Class is a _____ entity.
- a) Logical.
 - b) Physical.
 - c) Up normal.
 - d) Collection of.
26. Object is a _____ entity.
- a) Normal
 - b) Physical
 - c) Logical
 - d) Collection of
27. _____ can appear anywhere in the body of a java method.
- a) Definition.
 - b) Declaration.
 - c) Determine.
 - d) None of the above.
28. _____ must be the first non comment statement in the file.
- a) Package.
 - b) Class.
 - c) Object.
 - d) Declaration.
29. _____ is passed to a method by use of call-by-reference.
- a) Variables.
 - b) Objects.
 - c) Methods.
 - d) Operators.
30. Every method of a _____ is implicitly final.
- a) Static class.
 - b) Dynamic class.
 - c) Final class.
 - d) Abstract class.
31. A _____ object cannot be modified after it is created.
- a) Double.
 - b) Int.
 - c) String.
 - d) Main.
32. A _____ class may not have any abstract method.
- a) Abstract.
 - b) Static.
 - c) Final.
 - d) Public.
33. What will be the result of the expression 13 & 25?
- a) 38
 - b) 25

- c) 9
 - d) 12
34. What will be result of expression $9 \mid 9$?
- a) 1
 - b) 18
 - c) 9
 - d) 12
35. _____ Operators are overloaded for string objects?
- a) -, +
 - b) +, =
 - c) <<, >>
 - d) ++, --
36. Which of these cannot be declared static?
- a) class
 - b) variable
 - c) instance
 - d) method
37. A package is a collection of _____.
- a) Keywords.
 - b) Directory structure, Classes and Interfaces.
 - c) Editing tools.
 - d) Views.
38. _____ statement is valid for array declaration.
- a) `Int number();`
 - b) `Float number();`
 - c) `Float number[];`
 - d) `Count Int[];`
39. What is the output of relational operators?
- a) Integer.
 - b) Boolean.
 - c) Character.
 - d) Double.
40. Which of these operators can skip evaluating right hand operand?
- a) !
 - b) |
 - c) &
 - d) &&
41. Which exception is thrown by the `read()` method of Input Stream class?
- a) Exception.
 - b) `ClassNotFoundException`.
 - c) `ReadException`.
 - d) `IOException`.
42. Which of the following denotes a javadoc comment?
- a) `//#`
 - b) `/*`
 - c) `/**`
 - d) `/***`

43. Using the keyword Interface you can fully abstract a _____.
- a) Method
 - b) Keyword
 - c) Class
 - d) Variables
44. One interface can inherit another by use of the keyword _____?
- a) Public
 - b) Extends
 - c) Implements
 - d) Inherits
45. An exception is an _____ condition that arises in a code.
- a) Abnormal
 - b) Casual
 - c) Unfortunate
 - d) Opposite
46. _____ is at the top of the exception class hierarchy.
- a) Try
 - b) Throwable
 - c) Exception Class
 - d) Catch
47. In java, thread to thread communication is called _____.
- a) Passing
 - b) Sending
 - c) Messaging
 - d) Calling
48. Which of these access specifiers can be used for an Interface?
- a) Public
 - b) Protected
 - c) Private
 - d) All of the above
49. Java programs perform I/O through _____.
- a) I/O methods
 - b) I/O package
 - c) Streams
 - d) Compiler
50. In Java a _____ is a sequence of characters.
- a) String
 - b) ArrayChar
 - c) GroupChar
 - d) Collection
51. The String is defined in _____ namespace.
- a) Java.lang
 - b) Java.string
 - c) Java.char
 - d) Java.awt
52. _____ is a special member function.
- a) Method

- b) Class
 - c) User defined function
 - d) Constructor
53. Keyword _____ is always a reference to the object.
- a) New
 - b) This
 - c) Invoke
 - d) Class
54. _____ is the mechanism that binds together the code and the data.
- a) Polymorphism.
 - b) Encapsulation.
 - c) Inheritance.
 - d) Together.
55. Wrapper class is a wrapper around a _____ data type.
- a) Normal
 - b) Central
 - c) Primitive
 - d) Concrete
56. Once an interface has been defined, one or more _____ can implement that interface.
- a) Class
 - b) Object
 - c) Methods
 - d) Keywords
57. Variable declared as _____ do not occupy memory on a per instance basis.
- a) Static
 - b) Final
 - c) Abstract
 - d) Code
58. _____ must be the first statement executed inside a subclass Constructor.
- a) final()
 - b) super()
 - c) static{ }
 - d) None of these
59. Which function is used to perform some action when the object is to be destroyed?
- a) finalize()
 - b) delete()
 - c) main()
 - d) None of the above
60. The _____ statement is used to terminate a statement sequence.
- a) Break
 - b) Switch
 - c) Continue
 - d) Wait

Answer:- 1.a 2.b 3.a 4.c 5.b 6.a 7.c 8.b 9.c 10.b 11.c 12.d 13.b 14.a 15.a 16.a 17.c
18.c 19.d 20.a 21.b 22.d 23.b 24.a 25.a 26.b 27.b 28.b 29.b 30.c 31.c 32.c 33.c

34.c 35.b 36.c 37.b 38.c 39.b 40.d 41.d 42.c 43.c 44.b 45.a 46.b 47.c 48.a 49.c
50.a 51.a 52.d 53.b 54.b 55.c 56.a 57.b 58.b 59.a 60.a

Section-B

Short answer type questions

1. What are the OOP Principles?
2. What is Encapsulation?
3. What is Polymorphism?
4. What is Inheritance?
5. What are the features of Java Language?
6. What is the need for Java Language?
7. What is platform independency?
8. What is Architecture Neutral?
9. How Java supports platform independency?
10. What are the advantages of Java Language?
11. Give any 4 differences between C and Java.
12. Give any 4 differences between C++ and Java.
13. What are the different types of comment symbols in Java?
14. What are the data types supported in Java?
15. What is the difference between a char in C/C++ and char in Java?
16. How is a constant defined in Java?
17. What is the use of final keyword?
18. Write a simple program to calculate and display the sum of two integer number.
19. What is variable? Write the syntax to declare and initialize variable.
20. What is casting? Explain the need of casting with example.
21. What is array? Explain different types of array with their declaration and initialization syntax.
22. Write short note on the following: (I) Floating point literals (II) Boolean Literals
23. What are the different types of operators used in Java?
24. What is short-Circuit operator?
25. What is labeled break?
26. What is the use of for each control structure?
27. What is the need for static variables?
28. What is the need for static methods?
29. Compare static constants and final constants.
30. Why is main method assigned as public?
31. Why is main method assigned as static?
32. What are the types of variables Java handles?
33. What is the general form of a class?
34. What is the use of new keyword?
35. If ObjA1 is an object of class A created using new keyword, What does the statement A ObjA2=ObjA1; mean?
36. What is a constructor?
37. What is the difference between a constructor and a method?
38. What is the use of this keyword?
39. What are destructors?
40. How is object destruction done in Java?
41. What is Garbage collection?
42. What is the use of finalize method?
43. Compare Garbage collection and finalize method?
44. What is method overloading?

45. What is a String in Java?
46. What is the difference between a String in Java and String in C/C++?
47. Name a few String methods.
48. What is the difference between concat method and + operator to join strings?
49. How will you initialize arrays?
50. Use the array sort method to sort the given array.
51. What is wrapper class?
52. What are the different access specifiers available in Java?
53. What is the default access specifier in Java?
54. What is a package in Java?
55. Name some Java API Packages.
56. What is CommandLine Arguments?
57. Define Inheritance
58. What are the types of inheritance?
59. How is multiple inheritance achieved in java?
60. What is the use of super keyword?
61. Differentiate overloading and overriding.
62. Define polymorphism.
63. Differentiate static binding and dynamic binding.
64. When will a class be declared as final?
65. When will a method be declared final?
66. What is an abstract class?
67. What is the need for abstract classes?
68. Explain about protected visibility control.
69. What are the methods under "object" class / java.lang.Object.
70. Explain toString method of object class.
71. How will you create an instance of class.
72. Define an interface.
73. What is the need for an interface?
74. What are the properties of an interface?
75. Differentiate Abstract classes and interface.
76. What is object cloning?
77. Does Inheritance removes any fields/or methods of super class?
78. Mention the use of final keyword.
79. What is nested class? Mention its types.
80. What is inner class?
81. What is the need for inner classes?
82. What are the rules for inner class?
83. What is local inner class and anonymous inner class? Give their advantages.
84. Write the advantages and disadvantages of static nested class.
85. What is generic programming?
86. What are Checked and UnChecked Exception?
87. What are checked exceptions?
88. What are runtime exceptions?
89. What is the difference between error and an exception?
90. What classes of exceptions may be caught by a catch clause?.
91. If I want an object of my class to be thrown as an exception object, what should I do?
92. How to create custom exceptions?

93. What are the different ways to handle exceptions?
94. What is the purpose of the finally clause of a try-catch-finally statement?
95. What is the basic difference between the 2 approaches to exception handling?
96. Is it necessary that each try block must be followed by a catch block?
97. How does Java handle integer overflows and underflows?
98. Describe synchronization in respect to multithreading.
99. Explain different way of using thread?
100. What is synchronization and why is it important?
101. When a thread is created and started, what is its initial state?
102. What are synchronized methods and synchronized statements?
103. What method must be implemented by all threads?
104. What kind of thread is the Garbage collector thread?
105. What is a daemon thread?
106. What is a thread?
107. What are the ways in which you can instantiate a thread?
108. What are the states of a thread?
109. What are the threads will start, when you start the java program?
110. What is dynamic method dispatch?

Section-C

Long answer type questions

1. Explain OOP Principles.
2. Explain the features of Java Language.
3. Compare and Contrast Java with C.
4. Compare and Contrast Java with C++.
5. Explain Constructors with examples.
6. Explain the Date Class methods with examples.
7. Discuss in detail the access specifiers available in Java.
8. Explain the different visibility controls and also compare with each of them.
9. Explain Packages in detail.
10. Discuss some of the classes available under Lang package.
11. Illustrate static and final with examples.
12. Explain method overriding with example program.
13. Explain the concept of inheritance and its types.
14. Explain the concept of overriding with examples.
15. What is dynamic binding? Explain with example.
16. Explain interface with example.
17. What is object cloning? Explain deep copy and shallow copy with examples.
18. Explain static nested class and inner class with examples.
19. Explain the different methods supported in Object class with example.
20. Develop a static Inner class called Pair which has MinMax method for finding min and max values from the array.
21. Explain generic classes and methods.
22. Explain exception hierarchy.
23. What are the advantages of Generic Programming?
24. Explain the different ways to handle exceptions.
25. How Java handle overflows and underflows?

26. Explain the different states of a thread.
27. Explain thread synchronization with examples.
28. Explain the algorithm used for thread scheduling.
29. Describe multi threading with a simple program.
30. Write a simple program to demonstrate the use of labelled break statement.
31. Explain the need of this keyword with simple program.
32. What is method overloading? Explain with program.
33. What is constructor overloading? Explain with program.
34. What is Inheritance? Explain single and multilevel inheritance with program.
35. What is the use of super keyword? Explain with suitable program.
36. What is the use of final keyword? Explain with suitable program.
37. What is Jump statement? Explain their need with program.
38. What is String class? Write a program demonstrate the use of its methods (any five).
39. Write a simple program to create your own exception and handle it.
40. Write a simple program to demonstrate the use of labelled continue statement.
41. Explain hierarchical inheritance with program.
42. What is Interface? Write a simple program to demonstrate the use of interface.
43. What is two dimensional array? Write a simple program to calculate the addition of two metrics using two dimensional array.
44. Write a simple program to calculate the multiplication of two metrics using two dimensional array.
45. Write a program to create a Number class which can display the factorial of a number and can generate prime number up to n terms.
46. Write a java program to demonstrate the use of public and private access specifier in inheritance.
47. Write a java program to demonstrate the use of protected and private access specifier in inheritance.
48. What is arithmetic operator? Write a simple program to illustrate the use of arithmetic operators.
49. What is logical operator? How they differ from short circuit operator? Write a simple program to illustrate their difference.
50. What is Relational operator? Write a simple program to illustrate the use of relational operator.

B.Sc. Computer Science Semester - IV
Subject – Operation Research
Section-A

Multiple choice/Very short type questions

1. Operations Research (OR) , is a very powerful tool for -----
 - a) Research
 - b) Decision – Making
 - c) Operations
 - d) None of the above
2. The innovative science of Operations Research was discovered during -----
 - a) Civil War
 - b) World War I
 - c) World War II
 - d) Industrial Revolution
3. Who defined “Operations Research as scientific approach to problem solving for executive management “?
 - a) E.L. Arnoff
 - b) P.M.S. Blackett
 - c) H.M. Wagner
 - d) None of the above
4. Operations Research has the characteristics that it is done by a team of -----
 - a) Scientists
 - b) Mathematicians
 - c) Academics
 - d) All of the above
5. Operations Research simply helps in improving the ----- of the solution but does not result in a perfect solution.
 - a) Quality
 - b) Clarity
 - c) Look
 - d) None of the above
6. Operations Research attempts to find the best and ----- solution to a problem
 - a) Optimum
 - b) Perfect
 - c) Degenerate
 - d) None of the above
7. Which technique is used in finding solution for optimizing a given objective, such as profit maximization or cost minimization under certain constraints?
 - a) Queuing theory
 - b) Linear Programming
 - c) Inventory theory
 - d) None of the above
8. Linear Programming successfully applied in

- a) Product Mix
 - b) Military
 - c) Agriculture
 - d) All of the above
9. In linear programming the word 'linear' means that the relationships are represented by
- a) diagonal lines
 - b) curved lines
 - c) straight lines
 - d) slanting lines
10. For solving an assignment problem, which method is used?
- a) American
 - b) Hungarian
 - c) German
 - d) None of the above
11. The word ----- may be defined as some action that we apply to some problems or hypothesis.
- a) Research
 - b) Operation
 - c) Both A and B
 - d) None of the above
12. ----- are the representation of reality.
- a) Models
 - b) Phases
 - c) Both A and B
 - d) None of the above
13. Graphic method can be applied to solve a LPP when there are only ----- variable
- a) One
 - b) More than One
 - c) Two
 - d) Three
14. If the feasible region of a LPP is empty, the solution is -----
- a) Infeasible
 - b) Unbounded
 - c) Alternative
 - d) None of the above
15. A minimization problem can be converted into a maximization problem by changing the sign of coefficients in the -----
- a) Constraints
 - b) Objective Functions
 - c) Both A and B
 - d) None of the above

16. In simplex method , we add ----- variables in the case of ' \leq '
- Slack Variable
 - Surplus Variable
 - Artificial Variable
 - None of the above
17. In simplex method , we subtract ----- variables in the case of ' \geq '
- Slack Variable
 - Surplus Variable
 - Artificial Variable
 - None of the above
18. As for maximization in assignment problem, the objective is to maximize the -----
- Profit
 - cost
 - both a & b
 - None of the above
19. Operations Research approach is typically based on the use of
- Physical model
 - Mathematical model
 - Iconic model
 - Descriptive model
20. Linear programming has been successfully applied in -----
- Agriculture
 - Industrial applications
 - Both A and B
 - None of the above
21. Linear programming is a major innovation since ----- in the field of business decision making, particularly under conditions of certainty.
- Industrial Revolution
 - World War I
 - World War II
 - French Revolution
22. The word ' programming' means taking decisions -----
- Systematically
 - Rapidly
 - Slowly
 - Instantly
23. Which method is an iterative procedure for solving Linear programming problem in a finite number of steps?
- Surplus method
 - Slack method
 - M method
 - Simplex method
24. An objective function is maximized when it is a ----- function

- a) Passive
 - b) Profit
 - c) Cost
 - d) None of the above
25. An optimum solution is considered the ----- among feasible solutions.
- a) Worst
 - b) Best
 - c) Ineffective
 - d) None of the above
26. ----- is a subclass of a linear programming problem (LPP).
- a) Programming problem
 - b) Transportation problem
 - c) Computer problem
 - d) None of the above
27. A feasible solution is called a basic feasible solution if the number of non-negative allocations is equal to -----
- a) $m-n+1$
 - b) $m-n-1$
 - c) $m+n-1$
 - d) None of the above
28. VAM stands for -----
- a) Vogal's Approximation Method
 - b) Vogal's Approximation Method
 - c) Vangel's Approximation Method
 - d) Vogel's Approximation Method
29. A given transportation problem is said to be unbalanced, if the total supply is not equal to the total -----
- a) Cost
 - b) Demand
 - c) Both a & b
 - d) None of the above
30. We can find the initial basic feasible solution by using ----- ?
- a) VAM
 - b) MODI method
 - c) Stepping stone method
 - d) None of the above

Answer: 1.b 2.c 3.c 4.d 5.a 6.a 7.b 8.d 9.c 10.b 11.b 12.a 13.c 14.a 15.b 16.a 17.b
18.a 19.b 20.c 21.c 22.a 23.d 24.b 25.b 26.b 27.c 28.d 29.b 30.a

Section-B
Short answer type questions

1. Define operation research.
2. Write any three definitions of operation research.
3. Explain the history of operation research.
4. What are the characteristics of operation research?
5. Explain the significant features of operation research.
6. Define effectiveness of the system.
7. What are the general methods for solving operation research models?
8. Define analytical method for solving operation research model.
9. Define numerical method for solving operation research model.
10. Define Monte-carlo simulation for solving operation research model.
11. Describe the features of operation research solutions.
12. Explain any five techniques used in operation research.
13. Define 'linear programming'.
14. What are the assumptions in linear programming?
15. Explain the advantages of linear programming.
16. What are the limitations of linear programming?
17. Define simplex method.
18. Define slack variable.
19. Define surplus variable.
20. Define artificial variable.
21. Explain the following terms used in linear programming:
i) Objective function ii) Constraints iii) feasible solution iv) Optimal solution
v) Decision variable.
22. What is the function of slack, surplus and artificial variables in simplex procedure?
23. Define key column & key row. Explain how they are selected.
24. Define key number in simplex method.
25. Define a transportation problem.
26. Name the methods that are commonly used to establish initial solution for transportation problem.
27. Describe the steps of the north-west corner method to obtain an initial basic feasible solution.
28. Describe the steps of the least cost method to obtain an initial basic feasible solution.
29. Describe the steps of the VOGEL's approximation method to obtain an initial basic feasible solution.
30. Name the two methods to test initial feasible solution for optimality in linear programming.
31. Define imbalanced transportation problem.
32. Define an assignment problem.
33. Describe the special cases in assignment technique.

34. Describe in detail, any four application of operation research.
35. Explain unbalanced assignment problem with suitable example.
36. Explain maximization assignment problem with suitable example.
37. What is sequencing? Explain.
38. Write three different examples of sequencing problems from your daily life.
39. What are the assumptions made while dealing with sequencing problems?
40. Write the terminology used in sequencing.
41. Write a short note on the sequencing decision problem for n jobs on two machines.
42. How will you solve the sequencing of 'n' jobs on three machines?
43. How will you solve the sequencing of 'n' jobs on 'm' machines?
44. Obtain an initial basic feasible solution to the following transportation problem using North-west corner method:

From To Plants	Warehouse				Capacity
	P	Q	R	S	
A	5	1	3	3	34
B	3	3	5	4	15
C	6	4	4	3	12
D	4	1	4	2	19
Demand	21	25	17	17	80

45. Obtain an initial basic feasible solution to the following transportation problem using Least Cost method.

From To Plants	Warehouse				Capacity
	P	Q	R	S	
A	5	1	3	3	34
B	3	3	5	4	15
C	6	4	4	3	12
D	4	1	4	2	19
Demand	21	25	17	17	80

46. Explain the scope of operation research.
47. What are the shortcomings of operation research?

48. Explain any five application of linear programming.
 49. What is imbalanced transportation problem? Explain with example.
 50. Explain degeneracy in transportation problem.

Section-C
Long answer type questions

1. Describe briefly the different phases of operation research.
2. What is problem formulation in operation research? Describe the various component of problem formulation.
3. Explain briefly the applications of operation research.
4. Describe the techniques used in operation research.
5. Describe the salient features of linear programming.
6. Explain briefly the application of linear programming.
7. Write the steps in solving problems using simplex method.
8. Use Simplex method to

$$\begin{aligned} &\text{Maximize,} && z = 11x_1 + 4x_2 \\ &\text{Subject to constraints,} && 7x_1 + 6x_2 \leq 34 \\ &&& 4x_1 + 2x_2 \leq 32 \end{aligned}$$

$$\text{And } x_1 \geq 0, x_2 \geq 0$$

9. Use simplex method to

$$\begin{aligned} &\text{Maximize,} && z = 6x_1 + 11x_2 \\ &\text{Subject to constraints,} && 2x_1 + x_2 \leq 104 \\ &&& x_1 + 2x_2 \leq 76 \\ &&& x_1, x_2 \geq 0. \end{aligned}$$

10. Solve the following using simplex method

$$\begin{aligned} &\text{Maximize,} && Z=60x_1+50x_2 \\ &\text{Subject to ,} && 2x_1+3x_2 \leq 150 \\ &&& 3x_1+2x_2 \leq 150 \\ &&& x_1 \leq 40 \\ &&& x_2 \leq 40. \end{aligned}$$

11. Solve the following using simplex method:

$$\begin{aligned} &\text{Maximize,} && Z=3x_1+5x_2 \\ &\text{Subject to ,} && x_1+2x_2 \leq 2000 \\ &&& x_1+x_2 \leq 1500 \\ &&& x_2 \leq 600 \\ &&& \text{and } x_1, x_2 \geq 0. \end{aligned}$$

12. Solve the following using simplex method:

$$\begin{aligned} &\text{Maximize,} && Z=3x_1+2x_2 \\ &\text{Subject to ,} && 2x_1+x_2 \leq 40 \end{aligned}$$

$$2x_1 + 3x_2 \leq 60$$

$$x_1 + x_2 \leq 24$$

$$x_1, x_2 \geq 0.$$

13. Solve the following using simplex method:

$$\begin{aligned} &\text{Maximize,} && Z = 30x + 20y \\ &\text{Subject to,} && 3x + y \leq 1500 \\ &&& x + y \leq 1000 \\ &&& \text{and } x \& y \geq 0. \end{aligned}$$

14. Solve the following using simplex method:

$$\begin{aligned} &\text{Maximize,} && Z = 10x + 5y \\ &\text{Subject to,} && 4x + 5y = 100 \\ &&& 5x + 2y = 80. \\ &&& x \& y \geq 0. \end{aligned}$$

15. Solve the following using simplex method:

$$\begin{aligned} &\text{Maximize,} && Z = 20x + 10y \\ &\text{Subject to,} && x + 2y \leq 40 \\ &&& 4x + 3y \geq 60 \\ &&& 3x + y \geq 30 \\ &&& x, y \geq 0. \end{aligned}$$

16. Solve the following using simplex method:

$$\begin{aligned} &\text{Maximize,} && Z = 4x + 2y \\ &\text{Subject to,} && x + 2y \geq 2 \\ &&& 3x + y \geq 3 \\ &&& 4x + 3y \geq 6 \\ &&& \text{and } x, y \geq 0. \end{aligned}$$

17. Obtain an initial basic feasible solution to the following transportation problem using Vogel's approximation method:

From \ To Plants	Warehouse				Capacity
	P	Q	R	S	
A	5	1	3	3	34
B	3	3	5	4	15
C	6	4	4	3	12
D	4	1	4	2	19
Demand	21	25	17	17	80

18. What do you mean by VAM? Determine an initial basic feasible solution to the following transportation problem by using:

- (a) Vogel's approximation method,
 (b) North-West Corner Method,

Source \ Destination					Supply
	D1	D2	D3	D4	
S1	1	2	1	4	30
S2	3	3	2	1	30
S3	4	2	5	9	40
Demand	20	40	30	10	

19. Determine an initial basic feasible solution to the following transportation problem by using:
 (a) North-west Corner method,
 (b) Least Cost method,

Source \ Destination					Supply
	P	Q	R	S	
S1	21	16	15	3	11
S2	17	18	14	23	13
S3	32	27	18	41	19
Demand	6	6	8	23	

20. Find the optimal solution to the following transportation problem using Stepping Stone method.

Source \ Destination					Supply
	D1	D2	D3	D4	
A	6	3	5	4	22
B	5	9	2	7	15
C	5	7	8	6	8
Demand	7	12	17	9	

21. Find the optimal solution to the following transportation problem using MODI method.

Source / Destination					
	D1	D2	D3	D4	Supply
A	6	3	5	4	22
B	5	9	2	7	15
C	5	7	8	6	8
Demand	7	12	17	9	

22. Find the optimal solution to the following transportation problem using Stepping Stone method.

Plants	P	Q	R	Capacity
A	11	9	6	40
B	12	14	11	50
C	10	8	10	40
Demand	55	45	30	

23. Find the optimal solution to the following transportation problem using MODI method.

Plants	P	Q	R	Capacity
A	11	9	6	40
B	12	14	11	50
C	10	8	10	40
Demand	55	45	30	

24. Write the steps of Stepping Stone method for finding the optimal solution.

25. Write the steps of MODI method for find the optimal solution.

26. What is an assignment problem? Describe the mathematical formulation of an assignment problem.

27. Describe the various steps in the Hungarian method used for solving assignment problems.

28. Five jobs 1,2,3,4 and 5 are to be assigned to 5 machine A,B,C,D and E. The cost of assigning these jobs to the machine in Rupees is given in the following matrix. Determine the optimal

assignment algorithm so as to minimize the total cost. Calculate the total cost of optimal assignment.

Jobs	Machines				
	A	B	C	D	E
1	6	7	5	9	4
2	7	5	10	9	6
3	5	4	3	6	5
4	8	3	5	6	4
5	4	7	5	6	6

29. An automobile dealer wishes to put four repairmen to four different jobs. The repairmen have somewhat different kind of skills and they exhibit different levels of efficiency from one job to another. The dealer has estimated the number of man-hours that would be required for each job-man combination. This is given in the table below. Find the optimal assignment effective matrix in man-hours needed.

Man \ Job	A	B	C	D
1	5	3	2	8
2	7	9	2	6
3	6	4	5	7
4	5	7	7	8

30. There are four machine and four operators. Operators 1 charge Rs. 6,7,7 and 8 on machine I,II,III and IV respectively. Operators 2 charge Rs. 7,8,9 and 7 and Operators 3 charge Rs. 8,6,7 and 6, and Operators 4 charge Rs. 8,7,6 and 9 respectively (as given in below table). Assign one operator to one machine so that overall payment is minimum.

		Machine			
		I	II	III	IV
Operator	1	6	7	7	8
	2	7	8	9	7

	3	8	6	7	6
	4	8	7	6	9

31. Four lecturer, each capable of teaching any one of the four different subjects. Class preparation time in hours for different subjects varies from teacher to teacher and is given in the table below. Each lecturer is assigned only one subject. Determine an assignment schedule so as to minimize the total subject preparation time for all subjects.

Lecturer	Thermodynamics	Machine design	Production engg.	Operation research
A	2	10	9	7
B	15	4	14	8
C	13	14	16	11
D	4	15	13	9

32. Solve the following assignment problem: (4 Workers and 4 machines)

Machines

	A	B	C	D
1	10	25	15	20
2	15	30	5	15
3	35	20	12	24
4	17	25	24	20

33. Consider the problem of assigning five jobs to five persons. The assignment costs are given as follows:

		Job				
		1	2	3	4	5
Persons	A	8	4	2	6	1
	B	0	9	5	5	4
	C	3	8	9	2	6

	D	4	3	1	0	3
	E	9	5	8	9	5

Determine the optimum assignment schedule.

34. The completion time (in hours) of different jobs by different workers is as given below: suggest the optimal assignment of the workers to jobs.

		Workers			
		W	X	Y	Z
Jobs	A	8	7	9	10
	B	7	9	9	8
	C	10	8	7	11
	D	10	6	8	7

35. Five lecturers by experts are to be scheduled so as not to conflict with one another. The lecturers are to be delivered in the afternoon on week days only, because of other close schedules; certain students will be forced to drop out these lectures. The following table or matrix indicates the number of absentees lecture-wise and day-wise. Schedule these lectures in such a way as to minimize the total number of students forced to remain absent.

Lecture Day	1	2	3	4	5
Mon.	3	2	3	9	10
Tue.	11	5	9	10	2
Wed.	1	3	8	2	4
Thurs.	8	11	10	5	2
Fri.	8	6	5	6	9

36. 4 jobs A,B,C and D are to be assigned to 4 workers 1,2,3and 4 and the respective profits is rupees of these assignments is given in the following matrix. Determine the optimal assignment to maximize the profit. Calculate the maximum profit resulting from the assignment.

					Jobs			
					A	B	C	D

Workers	1	21	15	19	16
	2	19	16	20	20
	3	10	20	18	17
	4	18	17	19	20

37. A captain of a cricket team has to allot five middle order batting positions to five batsmen. The average runs scored by each batsman at these positions are given in the table. Find the optimal assignment of batsman to batting position.

		Batting Position				
		III	IV	V	VI	VII
Batsman	A	40	40	35	25	50
	B	42	30	16	25	27
	C	50	48	40	60	50
	D	20	19	20	18	25
	E	58	60	59	55	53

38. A company has one surplus truck in each of the cities A,B,C,D and E and one deficit truck in each of the cities 1,2,3,4,5 and 6. The distance between the cities in kilometres is shown in the matrix below. Find the assignment of trucks from cities in surplus to cities in deficit so that the total distance covered by the vehicles is minimum.

	1	2	3	4	5	6
A	12	10	15	22	18	8
B	10	18	25	15	16	12
C	11	10	3	8	5	9
D	6	14	10	13	13	12
E	8	12	11	7	13	10

39. A company has 5 jobs to be done. The following matrix shows the cost of assigning each job ($W_j=1,2,3,\dots$) to each machine ($M_j=1,2,3,\dots$). Assign five jobs to the five machines so as to minimize the total cost.

	I	II	III	IV	V
1	11	17	8	16	20
2	9	7	12	6	15
3	13	16	15	12	16
4	21	24	17	28	26
5	14	10	12	11	13

40. Five machines are available to process five jobs. Their processing times in hours are given below. The machine burden rate is Rs.100 per machine hour.

- Determine the assignment, one job to one machine that minimizes the total processing time.
- What is the total processing time for optimal assignment? What is the total machine cost optimally?

		Jobs				
		I	II	III	IV	V
Machines	A	3	10	3	1	8
	B	7	9	8	1	7
	C	5	7	6	1	4
	D	5	3	8	1	4
	E	6	4	10	1	6

41. Five new machines are to be located in a machine shop. There are five possible locations in which the machines can be located. C_{ij} , the cost of placing machine i in place j is given in the table below:

		Places				
		1	2	3	4	5
Machines	1	15	10	25	25	10
	2	1	8	10	20	2
	3	8	9	17	20	10
	4	14	10	25	27	15

5

10	8	25	27	12
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It is required to place the machine at suitable places so as to minimize the total cost. Solve the problem by assignment technique.

42. Solve the following assignment problem:

	A	B	C	D
I	1	4	6	3
II	9	7	10	9
III	4	5	11	7
IV	8	7	8	5

43. Solve the following assignment problem:

	A	B	C	D
I	10	12	19	11
II	5	10	7	8
III	12	14	13	11
IV	8	15	11	9

44. A team of 5 horses and 5 riders has entered a jumping show contest. The number of penalty points to be expected when each rider rides any horse is below.

Riders

	R ₁	R ₂	R ₃	R ₄	R ₅
H ₁	5	3	4	7	1
H ₂	2	3	7	6	5
H ₃	4	1	5	2	4
H ₄	6	8	1	2	3
H ₅	4	2	5	7	1

How should the horses be allotted to the riders so as to minimize the expected loss of the team?

45. Five jobs are performed first on machine M1 and then on machine M2. Time in hours taken by each job on each machine is given below:

Machine	Jobs				
	A	B	C	D	E
M ₁	5	1	9	3	10
M ₂	2	6	7	8	4

Determine the optimum sequence of jobs and the minimum time elapsed.

46. Six jobs are to be processed on two machines A and then on machine B. Time in hours taken by each job on each machine is given below.

	Jobs					
	1	2	3	4	5	6
Machine A	5	3	2	10	12	6
Machine B	3	2	5	11	10	7

Determine the optimum sequence of jobs that minimizes the total elapsed time to complete the jobs. And compute the minimum time.

47. In a factory, these are seven jobs to perform, each of which should go through two machines A and B. The processing times (in hrs.) for the jobs are as given below. Determine the sequence of these jobs that will minimize the total elapsed time.

Machines	Jobs						
	1	2	3	4	5	6	7
M/c A	4	13	16	7	11	12	10
M/c B	9	11	11	7	13	2	4

48. We have nine jobs, each of which must be processed on two machines I and II in the order I II. Processing times in hours are given in the table below:

	Jobs								
	A	B	C	D	E	F	G	H	I
m/c I	4	7	6	11	8	10	9	7	6
m/c II	8	10	9	6	5	11	5	10	13

Determine the sequence for the jobs that will minimize the total elapsed time.

49. In a machine shop, 8 different products are being manufactured each requiring time on two machines A and B as given below:

Product	Time (in min.) on machine A	Time (in min.) on machine B
I	30	20
II	45	30
III	15	50
IV	20	35
V	80	36
VI	120	40
VII	65	50
VIII	10	20

- (i) Decide the optimum sequence of processing of different products in order to minimize the total manufacturing time for all the products.
- (ii) The total minimum elapsed time.
- (iii) Idle time for machine A and B.
50. Find the sequence that minimizes the total elapsed time(in hours) required to complete the following jobs on three machines M1,M2,M3 in order M1-->M2-->M3:

Jobs

Machines	A	B	C	D	E
M1	6	8	7	10	6
M2	3	2	5	6	4
M3	4	8	6	7	8

51. Find the sequence that minimizes the total time in hours required to complete the following tasks:

Tasks

Machines	A	B	C	D	E	F	G
m/c 1	3	8	7	4	9	8	7
m/c 2	4	3	2	5	1	4	3

m/c 3	6	7	5	11	5	6	12
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What is the minimum elapsed time?

52. We have five jobs. Each of which must go through machines A, B and C in the order ABC. Processing time (in hours) are given in the following table:

Jobs

Machines	1	2	3	4	5
m/c A	8	10	6	7	11
m/c B	5	6	2	3	4
m/c C	4	9	8	6	5

Determine the optimal sequence of jobs that minimizes the total elapsed time. Also find the idle time for the machine A, B and C.

53. For the following data:

Job	1	2	3	4	5	6
m/c A	12	10	9	14	7	9
m/c B	7	6	6	5	4	4
m/c C	6	5	6	4	2	4

Determine the optimal sequence and the total elapsed time associated with it.

54. 5 jobs are to be processed on 4 machines. The processing time for each job on each machine is given as below. Determine the sequence of jobs that minimizes total elapsed total time to complete the jobs.

Machines	Jobs				
	A	B	C	D	E
M1	9	11	7	14	15
M2	2	1	3	-	4
M3	4	5	3	6	2
M4	13	6	11	7	9

55. There are four jobs each of which has to be processed on machines A,B,C,D,E and F in order ABCDEF. Processing time in hours is given below. Find out the optimal sequencing of jobs, minimum time required to process these jobs and the idle time for each of these machines.

Jobs	Machines					
	A	B	C	D	E	F
1	15	8	6	14	6	26
2	17	7	9	10	15	12
3	21	7	12	9	11	19
4	18	6	11	12	14	17

56. In a factory there are five jobs to perform, each of which must be processed on the two machines A and B in the order AB. Processing times in hours are as given below.

Job:	1	2	3	4	5
Machine A	7	3	11	5	12
Machine B	4	8	9	10	6

Determine a sequence for the five jobs that will minimize the total elapsed time.

57. Five jobs are performed, first on machine X and then on machine Y. The time taken, in hours by each job on each machine is given below:

Job:	A	B	C	D	E
Machine X	12	4	20	14	22
Machine Y	6	14	16	18	10

Determine the optimum sequence of that minimizes the total elapsed time to complete the jobs. Also compute the idle time for each machine.

58. Following table shows the minimum time (in hours) for 5 jobs on two different machines. Passing is not allowed. Find the optimal sequence in which jobs should be processed.

Job:	A	B	C	D	E
Machine M ₁	5	9	6	7	9
Machine M ₂	8	4	9	5	6

59. Seven jobs are to be processed on two machines A and B in The order A->B, each machine can process only one job at a time. The processing times in hours are as follows.

Job:	1	2	3	4	5	6	7
Machine A	10	12	13	7	14	5	16
Machine B	15	11	8	9	6	7	16

Determine the optimal sequence of job that minimizes the total elapsed time.

60. Determine the optimal sequence of job that minimizes the total elapsed time based on the following information. Processing time on machine is in hours and no passing is allowed.

Job:	1	2	3	4	5	6
Machine A	9	4	8	3	6	2
Machine B	4	5	7	3	2	7
Machine C	9	88	7	10	11	10

61. Determine the optimal sequence. The processing time (in hours) for 7 jobs on 3 machines is given below:

Job:	A	B	C	D	E	F	G
Machine M ₁	3	8	7	4	9	8	7
Machine M ₂	6	7	5	11	5	6	12
Machine M ₃	4	3	2	5	1	4	3

62. Solve the following sequencing problem:

	Job				
Machine	A	B	C	D	E
M ₁	10	12	8	15	16
M ₂	3	2	4	1	5
M ₃	5	6	4	7	3

M ₄	14	7	12	8	10
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63. Solve the following sequencing problem:

Job	Machines (processing time in hours)			
	M ₁	M ₂	M ₃	M ₄
A	12	5	3	12
B	9	2	9	9
C	13	3	4	13
D	14	3	3	14

B.Sc. Computer Science Semester - IV
Subject - System Analysis Design

Section-A

Multiple choice/Very short type questions

1. What is an important factor of management information system.
 - a) System
 - b) Data
 - c) Process
 - d) All
2. In a DFD external entities are represented by a
 - a) Rectangle
 - b) Ellipse
 - c) Diamond shaped box
 - d) Circle
3. A data flow can
 - a) Only emanate from an external entity
 - b) Only terminate in an external entity
 - c) May emanate and terminate in an external entity
 - d) May either emanate or terminate in an external entity but not both
4. can be defined as most recent and perhaps the most comprehensive technique for solving computer problems.
 - a) System Analysis
 - b) System Data
 - c) System Procedure
 - d) System Record
5. SDLC stands for
 - a) System Development Life Cycle
 - b) Structure Design Life Cycle
 - c) System Design Life Cycle
 - d) Structure development Life Cycle
6. Data cannot flow between two data stores because
 - a) it is not allowed in DFD
 - b) a data store is a passive repository of data
 - c) data can get corrupted
 - d) they will get merged
7. gives defining the flow of the data through and organization or a company or series of tasks that may or may not represent computerized processing.
 - a) System process
 - b) System flowchart
 - c) System design
 - d) Structured System

8. In the Analysis phase, the development of the _____ occurs, which is a clear statement of the goals and objectives of the project.
 - a) documentation
 - b) flowchart
 - c) program specification
 - d) design
9. Actual programming of software code is done during the _____ step in the SDLC.
 - a) Maintenance and Evaluation
 - b) Design
 - c) C)Analysis
 - d) Development and Documentation
10. is a tabular method for describing the logic of the decisions to be taken.
 - a) Decision tables
 - b) Decision tree
 - c) Decision Method
 - d) Decision Data
11. The approach used in top-down analysis and design is
 - a) to identify the top level functions by combining many smaller components into a single entity
 - b) to prepare flow charts after programming has been completed
 - c) to identify a top level function and then create a hierarchy of lower-level modules and components.
 - d) All of the above
12. Decision tree uses
 - a) pictorial depiction of alternate conditions
 - b) nodes and branches
 - c) consequences of various depicted alternates
 - d) All of the above
13. Problem analysis is done during
 - a) system design phase
 - b) systems analysis phase
 - c) before system test
 - d) All of the above
14. A _____ is an outline of a process that keeps develop successful information systems
 - a) System Development Life Cycle
 - b) CASE tool
 - c) Phased Conversion
 - d) Success Factors
15. An appraisal, of a system's performance after it has been installed, is called system
 - a) planning
 - b) review
 - c) maintenance

- d) batch Processing
16. is a group of interested components working together towards a common goal by accepting inputs and producing outputs in an organized transformation process.
- a) System
 - b) Network
 - c) Team
 - d) System Unit
17. A rectangle in a DFD represents
- a) a process
 - b) a data store
 - c) an external entity
 - d) an input unit
18. External Entities may be a
- a) Source of input data only
 - b) Source of input data or destination of results
 - c) Destination of results only
 - d) Repository of data
19. The major goal of requirement determination phase of information system development is
- a) determine whether information is needed by an organization
 - b) determine what information is needed by an organization
 - c) determine how information needed by an organization can be provided
 - d) determine when information is to be given
20. Requirement specification is carried out
- a) after requirements are determined
 - b) before requirements are determined
 - c) simultaneously with requirements determination
 - d) independent of requirements determination
21. The role of a system analyst drawing up a requirements specification is similar to
- a) architect designing a building
 - b) a structural engineer designing a building
 - c) a contractor constructing a building
 - d) the workers who construct a building
22. The final specifications are arrived at
- a) after feasibility study
 - b) during feasibility study
 - c) just before implementation phase
 - d) when the system is being designed
23. Which of the model is used for system components?
- a) PERT chart
 - b) (B)Gantt chart
 - c) Organizational hierarchy chart
 - d) (D)DFD

24. Which of the following does not occur in phase - 4 of the system development life cycle (SDLC)
- a) conduct interviews
 - b) train users
 - c) acquire hardware and software
 - d) test the new system
25. Translating the problem statement into a series of sequential steps describing what the program must do is known as:
- a) coding.
 - b) debugging.
 - c) creating the algorithm.
 - d) writing documentation.
26. Feasibility study is carried out by
- a) managers of the organization
 - b) system analyst in consultation with managers of the organization
 - c) users of the proposed system
 - d) systems designers in consultation with the prospective users of the system
27. System design is carried out
- a) as soon as system requirements are determined
 - b) whenever a system analyst feels it is urgent
 - c) after final system specifications are approved by the organization
 - d) whenever the user management feels it should be done
28. Data store in a DFD represents.
- a) a sequential file
 - b) a disk store
 - c) a repository of data
 - d) a random access memory
29. Organization chart is a type of
- a) basic chart
 - b) IPO chart
 - c) Hierarchical chart
 - d) step chart
30. The primary responsibility of a systems analyst is to
- a) specify an information system which meets the requirements of an organization
 - b) write programs to meet specifications
 - c) maintain the system
 - d) meet managers of the organization regularly

Answer:- 1.a 2.a 3.c 4.a 5.a 6.d 7.b 8.c 9.d 10.a 11.c 12.d 13.b 14.a 15.b 16.a 17.c 18.b 19.b 20.a 21.a 22.a 23.d 24.a 25.c 26.b 27.c 28.c 29.c 30.a

Section-B
Short answer type questions

1. What is the role of a Systems Analyst?
2. What are the interpersonal skills relevant to systems analyst work?
3. Explain the Technical skills relevant to system analyst work?
4. Describe the Classic Life Cycle Model?
5. Explain the Prototyping process model?
6. What do you mean by Business Modelling?
7. What do you mean by Data modelling?
8. What are the disadvantages of Rapid Application Development model?
9. What are the advantages of Spiral model?
10. Explain Fact Finding Method of System Analysis.
11. Differentiate between technical and operation feasibility?
12. Write down the various steps of cost/benefit analysis?
13. Define management,time and legal feasibility?
14. What cost elements are considered in cost/benefit analysis?
15. Differentiate between direct and indirect cost?
16. Differentiate between tangible cost and fixed cost?
17. What is the disadvantage and advantage of Payback method?
18. What is the disadvantage and advantage of cash flow analysis?
19. Distinguish between coupling and cohesion?
20. Differentiate between logical design and physical design?
21. Define structured design.
22. Define IPO,HIPO.
23. Define online data entry.
24. Differentiate between snapout and fanfold forms?
25. Differentiate between ballot box and check-off design?
26. What is testing?Explain it three techniques?
27. How is stress testing differ from volume testing?
28. Define Quality assurance.
29. Explain Artificial data testing and live test data.
30. Differentiate between compiling and assembling?
31. Explain parallel processing and system testing.
32. What is implementation and conversion?
33. Differentiate between software modification and software system audit.

34. What is role of audit trail in conversion?
35. What is involved in converting files?
36. What are the factors that affect preparation of plan?
37. What are the important points to be considered in contract document?
38. What are the several things to do before selection?
39. What is software. Explain contract checklist.
40. What strategies and tactics are used to control the negotiation process?
41. What are the requirements for management of the projects?
42. What are the several steps in establishing a project?
43. Explain Gantt chart.
44. Explain PERT.
45. Distinguish between Gantt and PERT?
46. Differentiate between task and activity?
47. Explain project management, Milestone, critical path?
48. What are the main function of a project team?
49. Explain two methods of calculating events?
50. What skills and qualifications are required of a project leader?

Section-C

Long answer type questions

1. Define System and explain its characteristics.
2. Explain the different types of Processing Systems.
3. Describe System Development Life Cycle and explain its various phases?
4. Explain the Waterfall Model?
5. Describe the Rapid Application Development Model? State its disadvantages?
6. Explain the Spiral Model? What are the advantages of this model?
7. Explain Information Gathering Process for System Development?
8. What is the role of a Systems Analyst?
9. Explain the different types of Processing Systems?
10. Explain the Distributed computing Processing system?
11. What is Feasibility? Describe the different types of Feasibility?
12. Explain structured analysis? What are the various tools for structure analysis?

13. What is Cost/Benefit Analysis? Explain its procedure.
14. Explain the various methods of evaluation?(net benefit analysis,present value analysis,net present value,payback analysis,break even analysis,cash flow analysis)
15. Define and explain the procedure for cost/benefit determinaton?
16. What audit considerations are included in system design?Illustrate.
17. How is structured walkthrough conducted?What is the role of the user in this activity?
18. What is the goal of functional decomposition approach to structured design?
19. Define structured design.How is it related to a DFD?
20. Explain the key elements of structure chart?
21. What is goal of input design and output design?
22. Explain briefly three approaches for data entry?
23. What is a form?Summarize the characteristics of action,memory,and report forms?
24. What factors determine paper selection?Explain.
25. Explain bottom-up and top-down approaches of debugging the program.
26. Define quality assurance.List and define the factors that affect the quality of a system?
27. What type of test data are used in system testing?
28. What is role of the DP auditor in system testing?
29. What levels of quality assurance must a system meet.Explain?
30. Why system testing is necessary?What performance criteria are used for system testing?
31. What is implementation?How does it differ from conversion?
32. Explain the major activities in conversion.Which activity is the most important.Why?
33. What is role of audit trail in conversion?Who performs it.Explain?
34. How you would design the plan?What are the objectives needed to considered as a basis for the plan?
35. If a new system is likely to meet user specifications, why do users resist change?How would one reduce resistance to change?Explain in detail.
36. What are the primary activities of a maintenance procedure?
37. Explain briefly the procedure of post-implementation review.Can you perform maintenance without post implementation.Why?
38. What factors are to be considered prior to system selection?Explain.
39. What are the major steps in selection?Which phase sets the tone for the vendor contact?

40. How important is the reliability factor in software packages? Discuss.
41. What are the criteria for selection of software to be considered?
42. What are the three methods of acquisition?
43. What are the reasons for system failure?
44. What is project management? Explain its function briefly.
45. Why does a system fail? How would one reduce potential failure in system development? Explain.
46. Discuss the steps for establishing a system project. Which step do you think is most critical. Why?
47. What is Gantt chart? How would you develop one? How does it differ from PERT chart? Explain.
48. Explain how a task leads to an activity and activity to a milestone?
49. Illustrate the steps taken in planning a project. What charts and forms are used? What information do they contain.
50. What information does PERT chart show? Explain the two methods of calculating events.
51. What is main function of project team? What skills should team members provide? Explain.
52. What is disaster/recovery planning? Why is it important? Who initiates the planning? What procedure is involved? Explain.
53. What types of failure are encountered in database environment? Explain briefly.
54. List and briefly explain the control measures in system security.
55. What are the major threats to system security? Which one is the most serious? Why?

B.Sc. Computer Science Semester - IV

Subject- Database Management System

Section-A

Multiple choice/Very short type questions

1. Which of the following is not the characteristics of DBMS
 - a) Integrity
 - b) Atomicity
 - c) Easy to access
 - d) Redundancy
2. Which of the following is not a type of database user
 - a) Naïve User
 - b) Application Programmer
 - c) DBA
 - d) Designer
3. Which of the following is not a type of key
 - a) Primary Key
 - b) Unique Key
 - c) Candidate key
 - d) Multi-user Key
4. Which of the following is not a component of ER Diagram?
 - a) A. Entity
 - b) B. Relation
 - c) C. Attribute
 - d) D. Hierarchy
5. What of the following dependency checked in Fourth normal form
 - a) Join Dependency
 - b) Multivalued Dependency
 - c) Partial Dependency
 - d) All of the above
6. What is full form of SQL
 - a) Static Query Language
 - b) Structured Query Language
 - c) Small Query Language
 - d) None of the above
7. Another name for a row in Database is
 - a) A. Field
 - b) B. Table
 - c) C. Tuple
 - d) D. All of the above
8. Dashed ellipse is used to represent
 - a) A. Multivalued Attribute
 - b) B. Derived Attribute
 - c) C. Composite Attribute
 - d) D. Single Valued Attribute
9. Which of the following is not a Database

- a) Oracle
 - b) MySQL
 - c) DB2
 - d) MS- Powerpoint
10. Which of the following command is used to delete structure of Database
- a) Delete
 - b) Drop
 - c) Alter
 - d) Modify
11. Data Base Management System (DBMS) is
- a) Collection of interrelated data
 - b) Collection of programs to access data
 - c) Both A & B
 - d) None
12. Which of the following is not a level of data abstraction
- a) Physical Level
 - b) View Level
 - c) Critical level
 - d) Logical level
13. In ER diagram, rectangle represents
- a) Entity
 - b) Attribute
 - c) Relation
 - d) Cardinality
14. Which of the following is not a component of ER Diagram?
- a) Entity
 - b) Relation
 - c) Attribute
 - d) Operator
15. Which of the following is database language
- a) DDL
 - b) DML
 - c) Query Language
 - d) All of the above
16. The primary key must be
- a) Not null
 - b) Unique
 - c) Both A & B
 - d) Any one of A & B
17. Which command is used to delete a table along with data and structure
- a) Delete
 - b) Drop
 - c) Alter
 - d) Erase
18. In DBMS, table is also referred as
- a) Tuple
 - b) Relation
 - c) Row

- d) Domain
19. Minimal super key are
- a) Domain key
 - b) Attribute key
 - c) Foreign Key
 - d) Candidate key
20. A table that displays data redundancies yields
- a) Insert anomaly
 - b) Update anomaly
 - c) Delete Anomaly
 - d) All of above
21. X In SQL the statement `select * from R, S` is equivalent to
- a) `Select * from R natural join S.`
 - b) `Select * from R cross join S.`
 - c) `Select * from R union join S.`
 - d) `Select * from R inner join S.`
22. The metadata is created by the
- a) DML compiler
 - b) DML pre-processor
 - c) DDL interpreter
 - d) Query interpreter
23. In SQL the word 'natural' can be used with
- a) inner join
 - b) full outer join
 - c) right outer join
 - d) all of the above
24. If the closure of an attribute set is the entire relation then the attribute set is a
- a) superkey
 - b) candidate key
 - c) primary key
 - d) not a key
25. DROP is a _____ statement in SQL.
- a) Query
 - b) Embedded SQL
 - c) DDL
 - d) DCL
26. If two relations R and S are joined, then the non matching tuples of both R and S are ignored in
- a) left outer join
 - b) right outer join
 - c) full outer join
 - d) inner join
27. The keyword to eliminate duplicate rows from the query result in SQL is
- a) DISTINCT
 - b) NO DUPLICATE
 - c) UNIQUE
 - d) None of the above

28. In 2NF
- No functional dependencies (FDs) exist.
 - No multivalued dependencies (MVDs) exist.
 - No partial FDs exist.
 - No partial MVDs exist.
29. Relational Algebra is
- Data Definition Language .
 - Meta Language
 - Procedural query Language
 - None of the above
30. Which of the following aggregate functions does not ignore nulls in its results?.
- COUNT .
 - COUNT (*)
 - MAX
 - MIN
31. Consider the join of relation R with a relation S. If R has m tuples and S has n tuples, then the maximum and minimum size of the join respectively are
- $m+n$ and 0
 - $m+n$ and $|m-n|$
 - mn and 0
 - mn and $m+n$
32. Maximum height of a B+ tree of order m with n key values is
- $\text{Log}_m(n)$
 - $(m+n)/2$
 - $\text{Log}_{m/2}(m+n)$
 - None of these
33. Which of the following is a reason to model data?
- Understand each user's perspective of data
 - Understand the data itself irrespective of the physical representation
 - Understand the use of data across application areas
 - All of the above
34. If an entity can belong to only one lower level entity then the constraint is
- disjoint
 - partial
 - overlapping
 - single
35. The common column is eliminated in
- theta join
 - outer join
 - natural join
 - composed join
36. In SQL, testing whether a subquery is empty is done using
- DISTINCT
 - UNIQUE
 - NULL
 - EXISTS
37. Use of UNIQUE while defining an attribute of a table in SQL means that the attribute values are

- a) distinct values
 - b) cannot have NULL
 - c) both (A) & (B)
 - d) same as primary key
38. The statement that is executed automatically by the system as a side effect of the modification of the database is
- a) backup
 - b) assertion
 - c) recovery
 - d) trigger
39. The normal form that is not necessarily dependency preserving is
- a) 2NF
 - b) 3NF
 - c) BCNF
 - d) 4NF

Section-B

Short answer type questions

1. What is DBMS?
2. What is the role of Database Administrator ?
3. Disadvantage in File Processing System?
4. Describe the three levels of data abstraction?
5. Define the "integrity rules".
6. What is extension and intension?
7. What is Data Independence?
8. What do you mean by Data processing ?
9. Which part of the RDBMS takes care of the data dictionary? How?
10. What do you mean by instance & schema ? Explain the difference between these.
11. What is the difference between Procedural DML and Non-Procedural DML ?
12. What is Data Model?
13. What is E-R model?
14. What is an Entity?
15. What is an Entity type?
16. What is an Entity set?
17. What is a composite attribute? Give examples.
18. What is a single valued attribute? Give examples.

19. What is a multi valued attribute? Give examples.
20. What do you mean by cardinality? What are different kinds of cardinalities ?
21. What is the difference between the strong entity set and weak entity set ?
22. Define subtype and supertype entities ?
23. Give example of following relationships :
 - a. Many-to-One
 - b. One-to-One
 - c. One-to-Many
 - d. Many-to-Many
24. What is an attribute?
25. What is a Relation Schema and a Relation?
26. What is degree of a Relation?
27. What is Relationship, Relationship set, and Relationship type?
28. What is degree of Relationship type?
29. What is SDL (Storage Definition Language)?
30. What is Data Storage - Definition Language?
31. What is DDL, DCL, and DML (Data Manipulation Language)?
32. What is Relational Algebra?
33. What are the unary operations in Relational Algebra?
34. What do you mean by atomicity and aggregation?
35. Differentiate between Cartesian product and natural join operations used in relational algebra.
36. What is a primary key ?
37. Define foreign key ? How does it play a role in the join operation ?
38. What are various Data types in SQL ?
39. What do you mean by SQL ?What are the characteristics of SQL ?
40. How are the nulls represented in database system?
41. What are aggregate functions?
42. What is the purpose of group by clause in the SELECT statement?
43. What are views? How they are created?
44. What do you mean by integrity constraints ?
45. What is the difference between WHERE and Having Clause ?

46. What are Armstrong rules? How do we say that they are complete and/or sound
47. Explain Functional dependency and Trivial functional dependency with examples.
48. Explain the term Distributed DBMS and Client-Server DBMS
49. Define the relational data model.
50. What is Functional Dependency?
51. What do you mean by redundancy ?How this can be avoided ?
52. When is a functional dependency F said to be minimal?
53. What is Multivalued dependency?
54. What is Lossless join property?
55. What is Fully Functional dependency?
56. What is lossy decomposition?
57. What is transitive dependency?
58. Explain Closure of Set of Functional dependency and Closure of Attribute sets
59. Explain Canonical cover and Extraneous Attributes with examples.
60. What do you understand by dependency preservation?
61. What are keys? What is primary, Foreign key?
62. What is meant by canonical cover?
63. What is meant by prime and non prime attribute?

Section-C

Long answer type questions

1. What is the need of the normalization? Explain the first three steps involved in the normalization.
2. What is 1NF, 2NF, 3NF and BCNF (Boyce-Codd Normal Form)?
3. Discuss the various type of join operations ? Why are these join required.
4. What is normalization?
5. Explain Various operators used in relational algebra.
6. Explain a) Database b) DBMS c) Program & Data independence d) end user e)DBA f) Data model g) Database schema h) DDL i) External schema j) conceptual schema k) DML l) VDL
7. Explain: i) Logical data independence ii) Physical data independence
8. Describe the role of DBA in DBMS

9. What are the elements of a database?
10. Why do we need DBMS?
11. Discuss the different classifications of DBMS.
12. What is the difference between external and internal schema?
13. What are the characteristics of a data in a database?
14. With a neat diagram, explain Three-Schema-Architecture.
15. What is the difference between logical data independence and physical data independence? Which is easier to accomplish? Why?
16. Define the following terms a) Entity b) Attribute c) Relationship instance d) Multi valued Attribute.
17. How is traditional file processing different from database approach?
18. Explain the types of software components which constitute a DBMS and the types of computer system software with which DMBS interacts.
19. What are the responsibilities of the DBA and the database designers?
20. What do you mean by Database Management System? Explain the various advantages of using a Database management System
21. Who are the different types of database end users? Discuss the main activities of each of them.
22. Write the general architecture of typical DBMS. What are the effects of data independence in DBMS?
23. What are the different levels of abstraction of a DBMS? Briefly explain each of them.
24. What does defining, manipulating and sharing of a database mean ?
25. Define the following terms a) entity b) attribute c) key attribute d) attribute value e) stored attribute f) derived attribute g) multi valued attribute h) composite attribute i) Weak Entity j) mapping constraints k) Cardinality Ratio l) Degree of relation) Participation constraint n) Candidate key o)Foreign key)Super key
26. Explain the difference between an attribute and value set.
27. What is the difference between the terms Relations and Relation Scheme.
28. With example explain strong and weak entities.
29. Explain types of attributes in ER model with an example .
30. What is an entity type, and an entity set? Explain the difference between a relationship instance and a relationship type.

31. Explain the concept of E-R model with an example.
32. Discuss the conventions for displaying an ER schema as an ER diagram.
33. Draw an E-R Diagram for the hospital management system. Assume your own entities (Minimum of 5 entities), attributes and relations. Explain in detail
34. Draw an E-R diagram for banking System. Assume your own entities (Minimum of 5 entities), attributes and relations, Mention cardinality ratio.
35. Write an ER diagram for a typical bus reservation system.
36. What is a participation role? When is it necessary to use role names in the description of relationship types?
37. Discuss the naming convention used for ER schema diagram.
38. Define foreign key. Explain the use of a foreign key with an example.
39. Explain the following operations in Relational Algebra and give one example for each i) Rename ii) Cartesian product iii) Natural join iv) Division
40. What is role of participation? When is it necessary to use role names in description or relation types?
41. . Discuss the entity integrity and referential integrity constraints. Why is each considered important?
42. Discuss the various update operations on relations and the types of integrity constraints that must be checked for each update operation.
43. Explain the select and project operations as used in relational algebra.
44. Discuss the different relational algebra operations.
46. Explain Basic Unary and set operation in Relational Algebra operations.
47. With an example explain clearly JOIN and UNION operations in relational algebra. Bring out the difference between natural JOIN and OUTER JOIN.
48. In relational algebra, discuss some types of queries for which renaming are necessary in order to specify the query unambiguously.
49. Define different set operations in relation algebra. Give one example for each.
50. List aggregate functions commonly used in relational algebra. Give example for any three of them.
51. Explain the following clauses: i) Form ii) Having iii) Order by iv) Group by
52. Give the syntax for creating a view in SQL.
53. List the types of privileges available in SQL.

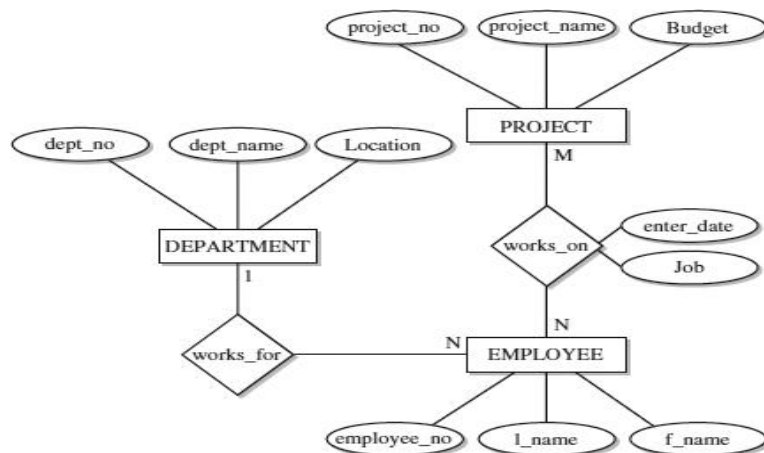
54. What are the different reasons for having variable length records?
55. Explain the commands available for modifying the database in SQL.
56. Explain the aggregate functions used with SQL.
57. Explain Having and Group By clauses.
58. Explain the SQL statements used with when clause.
59. How are the OUTER JOIN operations different from JOIN operations? How is the OUTER UNION operation different from UNION?
60. Discuss the various types of JOIN operations.
61. What is UNION compatibility? Why do the UNION, INTERSECTION and DIFFERENCE operations require that the relations on whom they are applied be union compatible?
62. List and explain the commands available for retrieving and updating the database in SQL.
63. Explain joins and views in SQL with Examples.
64. Explain with an example aggregate functions and grouping used with SQL.
65. Explain with an example in SQL i) Unspecified where-clause and use of asterisk. ii) Exist and not exists iii) Renaming attributes and joined tables.
66. Explain with an example in SQL i) HAVING clause ii) Nested queries iii) Aggregate functions and grouping iv) Substring comparisons and arithmetic operators and ordering
67. What do you mean by integrity with respect to database?
68. What is the significance of views in SQL? Give SQL statement to update data.
69. What is a functional dependency?
70. Why is a relation that is in 3NF generally considered good?
71. Prove augmentation rule and transitive rule of inference for functional dependencies
72. What is the necessity of normalization?
73. What is normalization? What is normal form? What are the different normal forms?
74. What do you mean by Insertion Anomaly and Deletion Anomaly ?
75. What is the dependency preservation property for decomposition? Why is it important?
76. What is the loss less join property of decomposition? Why is it important?
77. What is functional dependency? Explain with an example
78. What is meant by the closure of a set of functional dependencies?
79. What do you mean by equivalent minimal set of functional dependencies? Does every set of dependencies have a minimal equivalent set?
80. Define Boyce-Codd normal form. How does BCNF differ from 3NF?

81. What is First normal form?
82. What is Second normal form?
83. What is third normal form?
84. What is fourth normal form?
85. What is fifth normal form?
86. What is join dependency?
87. Define BCNF. How does it differ from 3NF? What is it considered a stronger form of 3NF?
88. Write loss-less Boyce Codd Normal Form decomposition algorithm ?
89. What are the design goals good database design? Is it always possible to achieve these goals? If some of these goals are not achievable, what alternate goals should you aim for and why?
90. What is the need for normalization? Explain first , second and third normal forms with example
91. What is a minimal set of functional dependencies? Give the algorithm to find a minimal cover for a given set of dependencies.
92. Write an algorithm to check if a decomposition dependency preserving
93. Explain the concepts of multi valued dependency and fourth normal form with suitable examples.
94. Explain the concepts of join dependency and lossless decomposition w.r.t 5NF
95. Write and explain the algorithms for non additive join property or lossless join.
96. What are the anomalies if the proper design of a database is not carried out? Illustrate with examples for each type.
97. Consider the universal relation $R = \{ A, B, C, D, E, F, G, H, I, J \}$ and the set of functional dependencies $F = \{ \{ A, B \} \rightarrow \{ C \}, \{ A \} \rightarrow \{ D, E \}, \{ B \} \rightarrow \{ F \}, \{ F \} \rightarrow \{ G, H \}, \{ D \} \rightarrow \{ I, J \} \}$
What is the key for R? Decompose R into 2NF, then 3NF relations.
98. Discuss the problem of spurious tuples and how we may prevent it.
99. Why should NULL's in a relation be avoided ?
100. Describe the concept of transitive dependency and explain how this is used to define 3NF ?
101. Given below are two sets of FDs for a relation $R(A, B, C, D, E)$. Are they equivalent? i) $A \rightarrow B, AB \rightarrow C, D \rightarrow AC, D \rightarrow E$ ii) $A \rightarrow BC, D \rightarrow AE$
102. If there is a relation $R(A, B, C, D, E)$ and set of Functional Dependency $F = \{ A \rightarrow BC, B \rightarrow D, E \rightarrow D \}$ find candidate keys

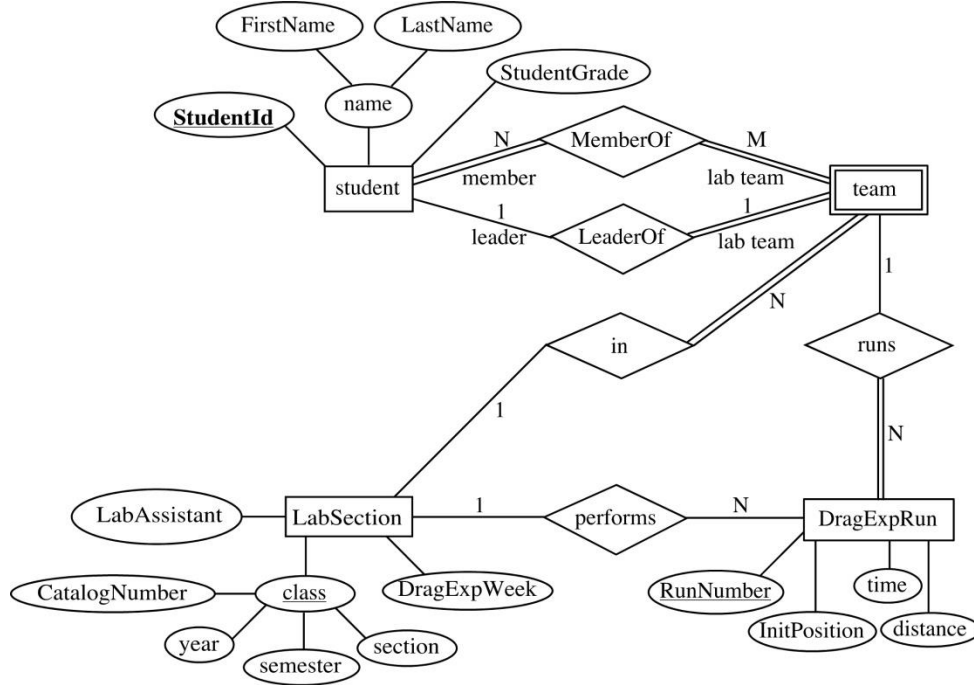
103. Given a relation R(ABCD) $F = \{AB \rightarrow CD, C \rightarrow A, D \rightarrow B\}$ Find all possible candidate keys?
104. For a relation R(ABCDEF) $F = \{A \rightarrow C, C \rightarrow DE, AC \rightarrow F\}$ find minimal cover
105. If there is R(A,B,C,D,E) and FD $F = \{A \rightarrow B, AC \rightarrow B, C \rightarrow D, D \rightarrow E\}$ find canonical cover?
106. If there is a relation R(A,B,C,D,E,F) $FD = \{A \rightarrow B, C \rightarrow DE, AC \rightarrow F\}$ and $D = \{BE, ACDEF\}$ check whether it is lossless decomposition.
107. Consider a relation R(ABCDEF) with set of functional Dependencies $FD = \{AC \rightarrow B, B \rightarrow D, D \rightarrow EF, F \rightarrow B\}$ Check whether the decomposition $D = (ABCD, BEF)$ is (a) Lossless decomposition (b) Dependency preserving decomposition
108. Draw an ER diagram for a database that keeps track of company and employee phones. Assume that an employee may work in many departments Employee may or may not have personal phone but a department must have one and have up to three phone numbers including employees' personal phone number.
109. Consider the following relations for a database that keeps track of business trips of sales persons in a sales office: Salesperson (Salespersonid, Name, Start-year, Dept-no) Trip (Salespersonid, from, to, Departure-date, Return-date, trip-id) Expense (trp-id, AccountNo, Amount) Specify the foreign keys for the above schema. Then specify the following queries in relational algebra.
1. Give the details (all attributes of trip relation) for trip that exceeded 10,000/- in expenses.
 2. Print the 'Salespersonid' and 'Name' of the salespersons who took trips to 'delhi'.
 3. Print the total trip expenses incurred by the salesman with Salespersonid = '504'.
110. Consider the following schema for a company database Employee (Name, SSN, Address, Sex, Salary, Dno) Department (Dname, Dnumber, MGRSSN, MGRSTART Date) Dept-Locations (Dnumber, Dlocations) Project (Pname, Pnumber, Plocations, Dnum) Works-On (ESSN, PNo, Hours) Dependent (ESSN, Dependent-name, Sex, Bdate, Relationship) Give the queries in SQL
1. Retrieve the names and address of employees who work for "Research" Department.
 2. List all the project names on which employee "Smith" is working.
 3. Retrieve all employees who either work in department 4 and make over 25000 per year or work in department 5 and make over 30,000.
 4. Retrieve the SSN of all employees who either work in department 5 or directly supervise an employee who works in department number.
 5. Retrieve names of each employee who have only daughter dependent.
111. Assume there are three relations i) STUDENT whose attributes are Stud No and Stud Name, ii) ASSIGNED_TO whose attributes are Stud No and Project No and iii) PROJECT whose attributes are Project No and Project area. Represent the following queries in relational algebra and SQL
1. Obtain Stud No and Stud Name of Obtain Stud No and Stud Name of all those students who are working on all those students who are working on database projects.
 2. Obtain Stud No and Stud Name of all those students who are working on both the projects having project numbers P-75 and P-81
 3. Obtain Stud No and Stud Name of all those students who do not work on the project number P-68.

4. Obtain Stud No and Stud Name of all students other than the students with Stud No 54 who work on at least one project.
112. Write SQL commands to perform the following.
- To create a table STUDENT with fields Register number, St-name, Address, course section, total marks.
 - To insert values to that table interactively
 - To create a view with fields register name and st-name.
 - To change the total marks to 35 if the marks lies in between 25 and 34.
 - To delete tuples from the relation if the total marks is less than
113. Consider the following relational schema: Emp (eid, ename, DOB, salary) Works (eid, pid, no-of-hrs, deptno) , Dept (deptno, dname, mgrid) Project (pid, Pname) Write SQL statement to
- Create the 'Works' relation including appropriate versions of all primary and foreign key integrity constraints.
 - Give every employee of did = '6' and 10% raise in salary.
 - Add 'John' as an employee with eid = '99', age = '30', and salary = '15,000'.
 - Delete the 'Research' department and explain what happens when this statement is executed.
114. Consider the following relational database schema Student (Student-id,Sname,major,GPA) Faculty (Faculty-id,fname,dept,designation,salary) Course (Course-id,Cname,Faculty-id) Enrol (Course-id,Student-id,grade) Write the following queries in SQL:
- List the names of all students enrolled for the course "IS6T1".
 - List the names of all students enrolled for the course "IS6T1 3" and have received "A" grade.
 - List all the departments having an average salary of above 5 Rs. 10,000.
 - Give a 20% raise to salary of all faculty.
 - List the names of all faculty members beginning with "P" and ending with letter "A".

115. Consider the following ER diagram. convert it into tables?



116. Consider the following ER diagram. convert it into tables?



B.Sc. Computer Science Semester - VI
Subject- Introduction to Artificial Neural Networks

Section-A

Multiple choice/Very short type questions

1. Which of the following is not a soft computing tool?
 - a) Fuzzy logic
 - b) Artificial Neural Network
 - c) Genetic algorithm
 - d) Artificial Intelligence
2. Which of the following is a non linear separable problem
 - a) Logical AND
 - b) Logical OR
 - c) Logical AND-NOT
 - d) Logical XOR
3. In which of the following neural network problem of network paralysis occurs
 - a) Back propagation network
 - b) Kohonen network
 - c) Hopfield network
 - d) None of the above
4. Which of the network follow winner takes all strategy
 - a) Back propagation network
 - b) Kohonen network
 - c) Hopfield network
 - d) None of the above
5. Which of the following is called memory network
 - a) Bidirectional Associative Memory.
 - b) Auto Associative Memory.
 - c) Both a and b
 - d) None of the above
6. A perceptron is:
 - a) a single layer feed-forward neural network with pre-processing
 - b) an auto-associative neural network
 - c) a double layer auto-associative neural network
 - d) a neural network that contains feedback
7. An auto-associative network is:
 - a) a neural network that contains no loops
 - b) a neural network that contains feedback
 - c) a neural network that has only one loop
 - d) a single layer feed-forward neural network with pre-processing
8. A 4-input neuron has weights 1, 2, 3 and 4. The transfer function is linear with the constant of proportionality being equal to 2. The inputs are 4, 10, 5 and 20 respectively. The output will be:
 - a) 238
 - b) 76
 - c) 119

d) 123

9. Which of the following is true?
- i. On average, neural networks have higher computational rates than conventional computers.
 - ii. Neural networks learn by example.
 - iii. Neural networks mimic the way the human brain works.
- a) All of the mentioned are true
 - b) (ii) and (iii) are true
 - c) (i), (ii) and (iii) are true
 - d) None of the mentioned
10. Which of the following is true for neural networks?
- (i) The training time depends on the size of the network.
 - (ii) Neural networks can be simulated on a conventional computer.
 - (iii) Artificial neurons are identical in operation to biological ones.
- a) All of the above
 - b) Only ii
 - c) I and ii
 - d) None of the above
11. What are the advantages of neural networks over conventional computers?
- (i) They have the ability to learn by example
 - (ii) They are more fault tolerant
 - (iii) They are more suited for real time operation due to their high 'computational' rates
- a) (i) and (ii) are true
 - b) (i) and (iii) are true
 - c) Only (i)
 - d) All of the above
12. Which of the following is true?
Single layer associative neural networks do not have the ability to:
- (i) perform pattern recognition
 - (ii) find the parity of a picture
 - (iii) determine whether two or more shapes in a picture are connected or not
- a) (ii) and (iii) are true
 - b) (ii) is true
 - c) All of the mentioned
 - d) None of the mentioned
13. Which is true for neural networks?
- a) It has set of nodes and connections
 - b) Each node computes it's weighted input
 - c) Node could be in excited state or non-excited state
 - d) All of the mentioned
14. Why is the XOR problem exceptionally interesting to neural network researchers?
- a) Because it can be expressed in a way that allows you to use a neural network
 - b) Because it is complex binary operation that cannot be solved using neural networks
 - c) Because it can be solved by a single layer perceptron
 - d) Because it is the simplest linearly inseparable problem that exists.
15. What is back propagation?
- a) It is another name given to the curvy function in the perceptron
 - b) It is the transmission of error back through the network to adjust the inputs

- c) It is the transmission of error back through the network to allow weights to be adjusted so that the network can learn.
- d) None of the mentioned
16. Why are linearly separable problems of interest of neural network researchers?
- Because they are the only class of problem that network can solve successfully
 - Because they are the only class of problem that Perceptron can solve successfully
 - Because they are the only mathematical functions that are continue
 - Because they are the only mathematical functions you can draw
17. Having multiple perceptrons can actually solve the XOR problem satisfactorily: this is because each perceptron can partition off a linear part of the space itself, and they can then combine their results.
- True – this works always, and these multiple perceptrons learn to classify even complex problems.
 - False – perceptrons are mathematically incapable of solving linearly inseparable functions, no matter what you do
 - True – perceptrons can do this but are unable to learn to do it – they have to be explicitly hand-coded
 - False – just having a single perceptron is enough
18. The network that involves backward links from output to the input and hidden layers is called as _____.
- Self organizing maps
 - Perceptrons
 - Recurrent neural network
 - Multi layered perceptron
19. Which of the following is an application of NN (Neural Network)?
- Sales forecasting
 - Data validation
 - Risk management
 - All of the mentioned
20. Which of the following is/are continuous activation function
- Log sigmoidal
 - Tangent hyperbolic
 - Threshold function
 - Both a and b
21. Which of the following is/are discrete activation function
- Log sigmoidal
 - Tangent hyperbolic
 - Threshold function
 - Both a and b
22. If $f(x) = 1/(1+e^{-x})$ then which of the following is the derivation of $f(x)$
- $f(x)(1-f(x))$
 - $f(x)(1+f(x))$
 - $(1+f(x))(1-f(x))$
 - $(1-f(x))^2$
23. If $f(x) = (e^x - e^{-x}) / (e^x + e^{-x})$ then which of the following is the derivation of $f(x)$
- $f(x)(1-f(x))$
 - $f(x)(1+f(x))$
 - $(1+f(x))(1-f(x))$

- d) $(1-f(x))^2$
24. How knowledge stores in ANN
- In form of weight
 - In form of bias
 - In form activation function
 - None of the above
25. In Back propagation Network
- Error obtained at outer layer are propagated in backward direction
 - Has feedback path
 - Both a and b
 - None of the above
26. For which of the following ANN can be used
- Pattern recognition
 - Stock forecasting
 - Voice recognition
 - All the above
27. Which of the following problem can be treated as linear seperable problem
- Logical AND
 - Logical OR
 - Logical AND-OR
 - All the above
28. Which of the following is/are terminology of Biological neural network
- Dendride
 - Axon
 - Nucleus
 - All the above
29. Which of the following is/are terminology of Artificial neural network
- Weight
 - Activation function
 - Bias
 - All the above
30. Error back propagation algorithm is
- Supervised learning algorithm
 - Unsupervised learning algorithm
 - Reinforcement learning algorithm
 - All the above

Answer:- 1.d 2.d 3.a 4.b 5.c 6.a 7.b 8.a 9.a 10.c 11.d 12.a 13.d 14.d 15.c 16.b 17. 18.c 19.d 20.c 21.c 22.a 23.c 24.a 25.a 26.d 27. 28. 29. 30.

Section-B

Short answer type questions

- Draw an architecture of simple artificial neural network and discuss .
- What do you understand by learning of artificial neural network.
- If input vector is $[1 \ 0 \ 1 \ 0]$ then calculate weight matrix in case of auto associative memory.

4. Explain limitations of single layer neural network.
5. Define the term bias and threshold in context of neural network.
6. List the main components of biological neuron .
7. What do you understand by learning rate and momentum in artificial neural network.
8. Which neural network model is basically used to perform basic logic operations like AND and OR?
9. What are the draw backs of Error Back Propagation Network (EBPN).
10. What are different types of learning.
11. How multi layer ANN can solve complex problem.
12. What are threshold and weight.
13. Draw a simple diagram of single layer Neural network and explain its various parts.
14. When bias in neural network is used?
15. Differentiate feed forward network with feed backward network.
16. Associate the characteristics of Biological Neural Network with Artificial Neural Network .
17. Write equation of any four activation functions.
18. What do you understand by learning of artificial neural network.
19. Explain limitations of single layer neural network.
20. A four input neuron has weights 1,2,3 and 4.The transfer function is linear with the constant of proportionality being equal to 2 .The inputs are 0,5,10 and 20 .What is the net output ?.
21. What do you understand by reinforcement learning of ANN?
22. What is the role of weight in ANN.
23. Define Euclidean distance.
24. Write benefits of ANN.
25. Write Applications of ANN.
26. Differentiate single layer neural network with multi layer neural network.
27. What are the different types of learning.?
28. What is preceptron.?
29. What do you mean by training and testing data partitions.?
30. Derive generalized delta learning rule.
31. Give example of feed backward NN.
32. Compare weights and bias.
33. How does threshold helps to obtain output.
34. How does the net input calculated using matrix multiplication method.
35. State few activation functions which are used in single layer NN.
36. What is linear separable problem.
37. Differentiate linear separable problem with non linear separable problem.
38. Discuss problem of local minima.
39. Draw a 2X3X1 architecture of ANN.
40. Compare computer with ANN.
41. How AI and ANN are related to each other
42. Define learning

43. What is the impact of a weight in an ANN.
44. List out limitations of perceptron.
45. Write weight updating formulae of perceptron learning.
46. Differentiate bias with threshold.
47. Explain derivation of log sigmoidal function.
48. Explain derivation of tangent hyperbolic function.
49. Explain at least 5 activation functions with its mathematical formulae.
50. Explain terminologies of ANN.

Section-C

Long answer type questions

1. Explain McCulloch-Pitts neuron .
2. Why sigmoidal activation function is used in BPN.?Why it is advantages over step activation function.
3. In what ways does ANN resemble the human brain.
4. What is the significance of weight used in ANN.
5. What are the various characteristics of ANN.
6. What are the basic building block of ANN.
7. Explain the algorithm used for training perceptron.
8. What are the stopping conditions used to stop the progress of the training algorithm.
9. Compare perceptron with Hebb net.
10. Briefly discuss on the learning rule of a perceptron network.
11. From a perceptron net for OR function with binary input and output. Compare it with the results obtained using bipolar input and targets.
12. Generate AND NOT function with bipolar data using perceptron learning rule with learning rates. (a) $\alpha = 1$ (b) $\alpha = 0.5$
Compare the variations noted.
13. Consider input vector $[0.3 \ 0.4 \ 0.5 \ 0.6]$ and weight vectors $w_1 = [1, 0.3, 0.4, 0.7, 0.8]$ and $w_2 = [0.2, 0.4, 0.5, 0.6, 1]$ with learning rate $= 0.3$. Train kohonen network for two iterations .
14. Draw architecture for following pair of input and output
Input vector: $[5; 6; 7; 8]$
Output vector: $[1]$ If weight vector is $[0.3, 0.4, 0.6, 0.3]$ then calculate net input
15. Write training and testing algorithm of error back propagation algorithm (EBPA) .Also discuss drawbacks of EBPA.
16. Implement ANDNOT function using McCulloch Pitts Neuron with binary input and output.
17. Discuss characteristics and architecture of multi layer neural network.
18. Explain weight updation process after introducing momentum term in case of Error Back Propagation neural network .Derive generalize formulae for weight updation.
19. Write Error back propagation algorithm with flow chart.
20. Draw an architecture of single layer neural network and find out suitable weight vector to solve logical OR problem with threshold activation function with threshold value 0.45.

21. What are the strengths and drawbacks of Error back propagation algorithm.?
22. Explain how logical XOR problem is non linearly separable problem.
23. Explain linearly separable and linearly non separable problem with suitable example.
24. Prove that the derivation of hyperbolic tangent function $f(x)$ is $[1+f(x)] * [1-f(x)]$.
25. Discuss characteristics and architecture of multi layer neural network.
26. What is the role of activation function? Explain different activation function used in ANN.
27. How can the equation of the straight line be formed using linear separability.?
28. Find the weights using perceptron learning for ANDNOT function for two epochs with binary inputs and targets.
29. What are the characteristics of multi layer neural network (MLNN) ? Explain with suitable example.
30. Why use ANN.? What are its advantages,
31. How are ANN different from normal computers.
32. How human brain works.?
33. List some practical applications of ANN.
34. What are the disadvantages of ANN.
35. Write history of ANN.
36. What are the main elements of biological neural network.
37. Compare the operations of AND function with bipolar inputs and targets using Hebb Net and perceptron net.
38. Differentiate between local minima and global minima.
39. Explain the training algorithm of radial Basis function Network.
40. Write short notes on choice of parameters in BPN.
41. How is data compression achieved in BPN.
42. Discuss in detail the activation function of RBFN.
43. Find out derivation of log sigmoidal activation function.
44. Find out derivation of tangent hyperbolic activation function.
45. Explain various problems faced in Back propagation network.
46. What is recurrent neural network , draw architecture of recurrent neural network.
47. Explain how learning behavior of ANN reflects the wide acceptability of ANN for real world application?
48. Explain perceptron network in terms of following:
(a) Architecture (b) Flowchart for training process and (c) Training Algorithm.
49. Prove that derivation of bipolar sigmoidal function $f(x)$ is $((1+f(x)) (1-f(x)))$.
50. Explain Error back propagation Network in terms of following:
(a)Architecture (b) Flowchart for training process and (c) Training Algorithm.

B.Sc. Computer Science Semester - VI
Subject - Computer Graphics

Section-A

Multiple choice/Very short type questions

1. The smallest addressable screen element is called
 - a) Pixel
 - b) Graph
 - c) voltage level
 - d) color information
2. Interactive computer graphics uses various kind of input devices such as
 - a) Mouse
 - b) Graphic tablet
 - c) Joystick
 - d) All of these
3. Input function are used for
 - a) Control the data flow from these interactive devices
 - b) Process the data flow from these interactive devices
 - c) Both a & b
 - d) None of these
4. A graphics package contains
 - a) No of housekeeping task such as clearing a display screen
 - b) No of housekeeping task such as initializing parameters
 - c) Both a & b
 - d) None of these
5. The interactive computer graphics involves_____ way communication b/w computer and the user
 - a) One
 - b) Two
 - c) Three
 - d) four
6. Interactive computer graphics enables a user to customize the graphics in _____
 - a) Computer way
 - b) His own way
 - c) Both a & b
 - d) None of these
7. User can make any change on image with the use of
 - a) Non-interactive graphics

- b) Interactive graphics
 - c) Both a & b
 - d) None of these
8. CAD means
- a) Car aided design
 - b) Computer art design
 - c) Computer aided design
 - d) None of these
9. DTP means
- a) Draw top publishing
 - b) Desk top publishing
 - c) Desk town publishing
 - d) None of these
10. PCBs can be drawn using the computer graphics
- a) In very efficiently way
 - b) In a shorter time
 - c) In a larger time
 - d) Both a & b
11. How many components of Interactive computer graphics are
- a) One
 - b) Two
 - c) Three
 - d) Four
12. What are the components of Interactive computer graphics
- a) A digital memory or frame buffer
 - b) A television monitor
 - c) An interface or display controller
 - d) All of these
13. A display controller serves to pass the contents of
- a) Frame buffer to monitor
 - b) Monitor to frame buffer
 - c) Both a & b
 - d) None of these
14. The image is passed repeatedly to the monitor _____in order to maintain a steady picture on the screen
- a) 25 times a second

- b) 30 times a second
 - c) 30 or more times a second
 - d) None of these
15. Raster graphics are composed of
- a) Pixels
 - b) Paths
 - c) Palette
 - d) None of these
16. Raster images are more commonly called
- a) Pix map
 - b) Bitmap
 - c) both a & b
 - d) none of these
17. Pixel can be arranged in a regular
- a) One dimensional grid
 - b) Two dimensional grid
 - c) Three dimensional grid
 - d) None of these
18. The brightness of each pixel is
- a) Compatible
 - b) Incompatible
 - c) Both a & b
 - d) None of these
19. Each pixel has _____ basic color components
- a) Two or three
 - b) One or two
 - c) Three or four
 - d) None of these
20. The quantity of an image depend on
- a) No. of pixel used by image
 - b) No. of line used by image
 - c) No. of resolution used by image
 - d) None
21. Higher the number Of pixels, _____ the image quality
- a) Bad
 - b) Better
 - c) Smaller
 - d) None of above
22. A palette can be defined as a finite set of colors for managing the
- a) Analog images
 - b) Digital images
 - c) Both a & b

- d) None of these
23. Display card are
- a) VGA
 - b) EGA
 - c) Both a & b
 - d) None of above
24. Display card is used for the purpose of
- a) Sending graphics data to input unit
 - b) Sending graphics data to output unit
 - c) Receiving graphics data from output unit
 - d) None of these
25. The types of hidden surface removal algorithm are
- a) Depth comparison, Z-buffer, back-face removal
 - b) Scan line algorithm, priority algorithm
 - c) BSP method, area subdivision method
 - d) All of these
26. Which surface algorithm is based on perspective depth
- a) 1.Depth comparison
 - b) 2.Z-buffer or depth-buffer algorithm
 - c) 3.subdivision method
 - d) 4.back-face removal
27. A three dimensional graphics has
- a) Two axes
 - b) Three axes
 - c) Both a & b
 - d) None of these
28. _____ as the most commonly used boundary presentation for a 3-D graphics object
- a) Data polygon
 - b) Surface polygon
 - c) System polygon
 - d) None of these
29. A three dimensional object can also be represented using_____
- a) Method
 - b) Equation
 - c) Point
 - d) None of these
30. An_____ can be considered as an extension of spherical surface
- a) Bezier
 - b) Ellipsoid
 - c) Shearing
 - d) None of these

31. _____ curve is one of the spline approximation methods
- a) Bezier
 - b) Ellipsoid
 - c) Shearing
 - d) None of these
32. A Bezier curve is a polynomial of degree _____ the no of control points used
- a) One more than
 - b) One less than
 - c) Two less than
 - d) None of these
33. The most basic transformation that are applied in three-dimensional planes are
- a) Translation
 - b) Scaling
 - c) Rotation
 - d) All of these
34. The transformation in which an object can be shifted to any coordinate position in three dimensional plane are called
- a) Translation
 - b) Scaling
 - c) Rotation
 - d) All of these
35. The transformation in which an object can be rotated about origin as well as any arbitrary pivot point are called
- a) Translation
 - b) Scaling
 - c) Rotation
 - d) All of these
36. The transformation in which the size of an object can be modified in x-direction,y-direction and z-direction
- a) Translation
 - b) Scaling
 - c) Rotation
 - d) All of these
37. Apart from the basic transformation , _____ are also used
- a) Shearing
 - b) Reflection
 - c) Both a & b
 - d) None of these
38. In which transformation ,the shape of an object can be modified in any of direction depending upon the value assigned to them
- a) Reflection
 - b) Shearing

- c) Scaling
 - d) None of these
39. In which transformation ,the mirror image of an object can be seen with respect to x-axis, y-axis ,z-axis as well as with respect to an arbitrary line
- a) Reflection
 - b) Shearing
 - c) Translation
 - d) None of these
40. How many types of projection are
- a) 1
 - b) 2
 - c) 3
 - d) 4
41. The types of projection are
- a) Parallel projection and perspective projection
 - b) Perpendicular and perspective projection
 - c) Parallel projection and Perpendicular projection
 - d) None of these
42. _____ is a flexible strip that is used to produce smooth curve using a set of point
- a) Spline
 - b) Scan-line method
 - c) Depth-sorting method
 - d) None of these
43. The types of spline curve are
- a) Open spline
 - b) Closed spline
 - c) Both a & b
 - d) None of these
44. Cubic spline are
- a) Simple to compute
 - b) Provides continuity of curves
 - c) Both a & b
 - d) None of these
45. The parametric form of 3D spline are
- a) $X=f(t),y=g(t),z=h(t)$
 - b) $X=a_0,y=b_0,z=c_0$
 - c) $F(t)=0,g(t)=0,h(t)=0$
 - d) None of these
46. The value of t lies between

- a) 1 and 2
- b) 1 and 10
- c) 0 and 1
- d) 0 and 3

47. The surfaces that is blocked or hidden from view in a 3D scene are known as

- a) Hidden surface
- b) Frame buffer
- c) Quad tree
- d) None of these

48. The problem of hidden surface are

- a) Removal of hidden surface
- b) Identification of hidden surface
- c) Both a & b
- d) None of these

49. How many types of hidden surface algorithm are

- a) 1
- b) 2
- c) 3
- d) 4

50. Why we need removal of hidden surface

- a) for displaying realistic view
- b) for determining the closest visible surface
- c) Both a & b
- d) None of these

Answer:- 1.a 2.d 3.c 4.c 5.b 6.b 7.b 8.c 9.b 10.d 11.c 12.d 13a 14.c 15.a 16.b
 17.b 18.b 19.c 20.a 21.b 22.b 23.c 24.b 25.d 26.b 27.b 28.b 29.b 30.b 31.a
 32.b 33.d 34.a 35.c 36.b 37.c 38.b 39.a 40.b 41.a 42.a 43.b 44.c 45.a 46.c 47.a
 48.c 49.b 50.c

Section-B

Short answer type questions

1. Differentiate between random scan and raster scan technique?
2. What do you mean by computer graphics?
3. Explain CRT monitor?
4. Explain flat panel display. Name its component?
5. Define color CRT monitor?
6. Define video cards?
7. What is refresh rate? Also write down formula for calculating refresh rate.

8. Differentiate between beam penetration method and shadow mask method?
9. What is viewing transformation?
10. Differentiate between image space and object space?
11. Define shearing and give example.
12. Explain the midpoint circle generating algorithm.
13. Explain 3D display methods.
14. What is Z-buffer algorithm?
15. Write a note on fractars.
16. What is a display file structure?
17. What do you mean by periodic B-spline curves?
18. What do you mean by non-periodic B-spline curves?
19. Define interpolation splines.
20. Define approximation splines.
21. Define spline surfaces.
22. Explain bezier curve generating program with example.
23. Differentiate between open uniform and non uniform B-Spline curves?
24. Give a brief overview on horner's rule.
25. Illustrate recursive spline-subdivision procedure with example.
26. Write different applications of computer graphics.
27. What do you mean by segments?
28. What are different attributes in segment table?
29. Explain in detail about depth buffer method.
30. Write short note on animation.
31. Write short note on half toning.
32. Write note on B-Rep.
33. Write note on CSG.
34. What do you mean by homogenous coordinate?
35. What are the hardware devices used for computer graphics?
36. What is meant by scan code?
37. What is chromaticity diagram?
38. What are the different types of projection techniques?
39. What are the application of computer graphics?
40. Explain HLS color model.
41. Explain 4 types of antialiasing methods?
42. Explain LCD and LED working?
43. Differentiate between RGB and HSV color model?
44. Explain CIE chromaticity number?
45. Explain in detail about Gourand shading model.
46. Compare Gourand shading with Phong shading model.
47. Describe orthogonal projection?
48. How to convert a RGB color model to HSV color model describe?
49. Explain CMY color model.

50. Explain YIQ color model.

Section-C

Long answer type question

1. Explain working of Random and raster scan display techniques?
2. Differentiate between color CRT and CRT monitor working? Give a brief overview over working of CRT monitor.
3. Give a brief overview on beam penetration and shadow mask method working.
4. Define flat panel display. Also illustrate it in detail.
5. Write short note on color model.
6. What are aliasing and antialiasing? Explain any one antialiasing method.
7. What are the disadvantages of DDA algorithm?
8. Explain the method to draw a thick line using Bresenham's algorithm..
9. Explain RGB and CMY color model.
10. Explain flood fill algorithm in detail.
11. Define window and viewport. Derive window to viewport transformation?
12. Explain the mid point circle generating algorithm.
13. Explain the steps used in rotation of 2D object about an arbitrary axis and derive the matrices for same.
14. Explain liang-barsky line clipping algorithm with suitable example.
15. Explain sutherland-hodgeman polygon clipping algorithm in detail.
16. What are parallel and perspective projections and derive the matrix for perspective projection?
17. Explain the properties of bezier curve.
18. What is the use of scan line method and explain all the steps.
19. Write a short note on OpenGL.
20. Write a short note on flood fill algorithm.
21. Explain weber-atherton algorithm for polygon clipping. What are its advantages over other polygon clipping algorithm?
22. Write a short note on composite transformation.
23. Explain the different raster techniques and transformation associated with it?
24. Explain scan line fill algorithm with some suitable examples.
25. Write a short note on sweep representations.
26. Explain gourand and phong shading with their advantage and disadvantage.
27. Differentiate between incremental algorithms over DDA with example?
28. Explain the simple illumination model with example?
29. Explain the virtual reality and its applications in the computer graphics?
- 30.
31. State the properties of bezier curve. How can a bezier surface be generated from bezier curve?
32. Illustrate inside outside test.

33. What is a display file structure? Also explain the need for display file interpreter?
34. State which operations can be done on segments and also explain the same. What is segment?
35. Write short note on Warnock algorithm.
36. Describe three 3D representation methods.
37. What are various clipping operations?
38. Explain Nicholl-Lee-Nicholl algorithm with the help of an example.
39. Explain the following terms with practical applications: (a) 3D Mirror (b) 2D Rotation
40. Explain in detail about circle clipping algorithm. Where do you require circle clipping algorithm?
41. How can you draw a circle? Explain with algorithm.
42. Explain in detail about polygon table. How can you apply it in the case of computer animation?
43. What is a polygon mesh? Explain the application of polygon mesh with example.
44. Justify that hidden surface removal is required in computer graphics. Explain in detail about depth buffer method.
45. Explain in detail about scan line method. Justify that it is better than depth buffer method.
46. Differentiate between text and exterior clipping.
47. Explain: translation, shearing, scaling, rotation, reflection.
48. Explain in detail about Phong shading. How can you modify Phong shading model?
49. Define polygon. What are the different types of polygons? Explain with example.
50. Differentiate between periodic B-spline curves and non-periodic B-spline curves.

B.Sc. Computer Science Semester - VI
Subject - ASP.NET

Section-A

Multiple choice/Very short type questions

1. Which of the following defines boxing correctly?
 - a) When a value type is converted to object type, it is called boxing.
 - b) When an object type is converted to a value type, it is called boxing.
 - c) Both of the above
 - d) None of the above
2. Which of the following defines boxing correctly?
 - a) When a value type is converted to object type, it is called boxing.
 - b) When an object type is converted to a value type, it is called boxing.
 - c) Both of the above
 - d) None of the above
3. Which of the following is correct about value type variables in C#?
 - a) The value types directly contain data.
 - b) int, char, and float, which stores numbers, alphabets, and floating point numbers, respectively are value types.
 - c) When you declare an int type, the system allocates memory to store the value.
 - d) All of the above
4. Which of the following is a reserved keyword in C#?
 - a) abstract
 - b) as
 - c) foreach
 - d) All of the above
5. Which of the following keyword is used for including the namespaces in the program in C#?
 - a) imports
 - b) using
 - c) exports
 - d) None of the above
6. Which of the following is the default access specifier of a class member function?
 - a) Private
 - b) Public
 - c) Protected
 - d) Internal
7. Which of the following access specifier in C# allows a class to hide its member variables and member functions from other functions and objects?
 - a) Public
 - b) Private
 - c) Protected

- d) Internal
8. Which of the following is the correct about static member variables of a class?
 - a) We can define class members variables as static using the static keyword.
 - b) When we declare a member of a class as static, it means no matter how many objects of the class are created, there is only one copy of the static member.
 - c) Both of the above
 - d) None of the above
 9. Which of the following access specifier in C# allows a class to expose its member variables and member functions to other functions and objects?
 - a) Public
 - b) Private
 - c) Protected
 - d) Internal
 10. Which of the following is correct about Object Type in C#?
 - a) The Object Type is the ultimate base class for all data types in C# Common Type System (CTS).
 - b) Object is an alias for System.Object class.
 - c) The object types can be assigned values of any other types, value types, reference types, predefined or user-defined types.
 - d) All of the above
 11. Which of the following is correct about params in C#?
 - a) By using the params keyword, a method parameter can be specified which takes a variable number of arguments or even no argument.
 - b) Additional parameters are not permitted after the params keyword in a method declaration.
 - c) Only one params keyword is allowed in a method declaration.
 - d) All of the above.
 12. Which of the following is the correct about interfaces in C#?
 - a) Interfaces are declared using the interface keyword.
 - b) Interface methods are public by default.
 - c) Both of the above.
 - d) None of the above.
 13. Which of the following operator casts without raising an exception if the cast fails in C#?
 - a) ?:
 - b) is
 - c) as
 - d) *
 14. Which of the following is true?
 - a) DataTable object contain DataRow and DataColumn objects
 - b) DataSet and DataTable can be binary serialized
 - c) DataSet and DataTable can be XML serialized
 - d) All of the above

15. Which of the following works on client side?
 - a) ViewState
 - b) HiddenField
 - c) ControlState
 - d) All of the above
16. Which of the following works on server side?
 - a) ViewState
 - b) HiddenField
 - c) Application and session
 - d) All of the above
17. Application_Start event is available in which file?
 - a) Global.asax
 - b) Local.asax
 - c) Web.config
 - d) None of the above
18. What is the file extension of web page in ASP.NET?
 - a) .ascx
 - b) .asmx
 - c) .aspx
 - d) .asp
19. Range Validator control in ASP.NET supports which type?
 - a) Integer
 - b) String
 - c) Currency
 - d) All of the above
20. What is the last event of web page life cycle?
 - a) Page_Load
 - b) Page_LoadComplete
 - c) Page_Finish
 - d) Page_Unload
21. The first event triggers in an aspx page is.....
 - a) Page_Init()
 - b) Page_Load()
 - c) Page_click()
 - d) Page_PreLoad()
22. What is the base class from which all Web forms inherit?
 - a) Master Page
 - b) Page Class
 - c) Session Class
 - d) None of the Above
23. Which of the following transfer execution directly to another page?
 - a) Server.Transfer

- b) Response.Redirect
 - c) Both A. and B.
 - d) None of the Above
24. How do you manage states in asp.net application?
- a) Session Objects
 - b) Application Objects
 - c) Viewstate
 - d) All of the above
25. Select the control which does not have any visible interface.
- a) Datalist
 - b) DropDownList
 - c) Repeater
 - d) DatagridView
26. Which protocol is used for requesting a web page in ASP.NET from the Web Server?
- a) HTTP
 - b) TCP
 - c) SMTP
 - d) None of the above
27.is the DataType return in IsPostBack property.
- a) boolean
 - b) int
 - c) object
 - d) string
28. What is/are true about master page?
- a) Master page contains a <% @ Master %> directive instead of the normal <% @ Page %> directive.
 - b) ContentPlaceHolder control can be added only on master page.
 - c) You can add as many ContentPlaceHolders to a Master Page as you need.
 - d) All of the above.
29. What is/are true about master page? Choose the correct option.
- a) You can add more than one master page in a website.
 - b) Master page can be nested.
 - c) ContentPlaceHolder control is required on a content page.
 - d) Both A and B options are correct.
30. What is/are the advantages of master page?
- a) It helps to display common content in multiple pages.
 - b) They allow you to centralize the common functionality of your pages so that you can make updates in just one place.
 - c) It helps to create a common page layout.
 - d) All of the above.
31. Which attribute is necessary for HTML control to work as a HTML server control?
- a) runat="server"

- b) runat="web-server"
 - c) ID="server"
 - d) ID="web-server"
32. There is a button on page name cancel and it should bypass validation when cancel button is clicked. What will you do?
- a) set CausesValidation = false
 - b) set RemoveValidation=true
 - c) set cancel=true
 - d) None of the above
33. Which ado.net class provide disconnected environment?
- a) DataReader
 - b) DataSet
 - c) Command
 - d) None of the above
34. What data type is returned when calling the ExecuteScalar method of a command object?
- a) System.Int32
 - b) Object
 - c) No of effected records
 - d) None of the above
35. How do you get information from a form that is submitted using the "post" method?
- a) Request.QueryString
 - b) Request.Form
 - c) Response.write
 - d) Response.writeln
36.is the validation control used for "PatternMatching"
- a) RegularExpressionValidator
 - b) RangeValidator
 - c) FieldValidator
 - d) PatternValidator
37. Clicking a CheckBox does not cause an automatic PostBack. How do you make the CheckBox cause an automatic PostBack?
- a) Set the AutoPostBack property to true.
 - b) Add JavaScript code to call the ForcePostBack method.
 - c) Set the PostBackAll property of the Web Page to true.
 - d) None of the above
38. What are the Command Object Methods?
- a) ExecuteNonQuery
 - b) ExecuteReader
 - c) ExecuteScalar
 - d) All of the above
39. Which property will you set for each RadioButton Control in the group?
- a) Specify the same GroupName for each RadioButton.

- b) Specify the different GroupName for each RadioButton.
 - c) Specify the same GroupID for each RadioButton.
 - d) Specify the same ID for each RadioButton.
40. If you want to validate the email addresses, Social Security numbers, phone numbers, and dates types of data, which validation control will be used?
- a) RegularExpressionValidator
 - b) CompareValidator
 - c) RequiredFieldValidator
 - d) None of the above

Answer:- 1.b 2.a 3.d 4.d 5.b 6.a 7.b 8.c 9.a 10.d 11.d 12.c 13.c 14.d 15.d 16.c
 17.a 18.c 19.d 20.d 21.a 22.b 23.a 24.a 25.c 26.a 27.a 28.d 29.d 30.d 31.a
 32.b 33.b 34.b 35.b 36.a 37.a 38.d 39.a 40.a

Section-B

Short answer type questions

1. What is .Net?
2. What is ASP.NET?
3. What is a IL?
4. What is a CLR?
5. What is a CLS(Common Language Specification)?
6. What is a Managed Code?
7. What is an Assembly?
8. What is a Manifest?
9. What is NameSpace?
10. What is class?
11. What is Object?
12. What is Delegate?
13. What is abstract class?
14. What is interface?
15. What is Event?
16. Do events have return type?
17. What is Dispose method in .NET?
18. What is ArrayList?
19. What is a HashTable?
20. What are queues and stacks?
21. What is nested Classes?
22. What is Operator overloading in .NET?
23. How can we identify that the Page is Post Back?
24. Can you explain “AutoPostBack”?
25. What is a SESSION and APPLICATION object?
26. What is the difference between Authentication and authorization?
27. What are the two fundamental objects in ADO.NET?

28. What is the use of connection object?
29. What is the use of command objects?
30. What is the use of data adapter?
31. What is Dataset object?
32. What are the various objects in Dataset?
33. What is basic use of “Data View”?
34. What is XML?
35. What is CSS?
36. Is XML case sensitive?
37. What is Ajax?
38. What is Difference between Namespace and Assembly?
39. Can we force garbage collector to run?
40. What are Value types and Reference types?
41. What is concept of Boxing and UnBoxing?
42. What is concept of Casting?
43. What is Exception? What is the difference between System exceptions and Application exceptions?
44. What is the difference between Convert.toString and .toString () method?
45. What is view state and use of it?
46. What are user controls and custom controls?
47. What are the validation controls?
48. What is the difference between Response.Write() and Response.Output.Write()?
49. What methods are fired during the page load?
51. List the 4 common ADO.NET Namespaces?
52. How do you ensure that the database connections are always closed?
53. What is SqlCommand.CommandTimeout Property used for?
54. How do you create an instance of SqlDataReader class?
55. How do you programatically check if a specified SqlDataReader instance has been closed?
56. How do you get the total number of columns in the current row of a SqlDataReader instance?
57. What is the use of SqlParameter.Direction Property?
58. What is the difference between a DataReader and a DataSet?
59. How can you enable automatic paging in DataGrid ?
60. What is the difference between Server.Transfer and response.Redirect ?
61. What is the Difference between ASP and ASP.NET?
62. How do you upload a file in ASP.NET ?

Section-C

Long answer type questions

1. What is difference between Data grid, Datalist, and repeater?
2. How can we format data inside Data Grid?

3. What is the namespace in which .NET has the data functionality class?
4. Explain ADO.NET architecture in detail.
5. Give an example that shows how to execute a stored procedure in ADO.NET?
6. What is the difference between DataReader and DataAdapter?
7. What is Microsoft ADO.NET?
8. What are the 3 major types of connection objects in ADO.NET?
9. How do you read an XML file into a DataSet?
10. When do you use ExecuteReader, ExecuteNonQuery, ExecuteScalar methods?
11. What are basic methods of Data adapter? Write a program to illustrate the use of any two methods.
12. Explain common properties of HTML server controls.
13. Explain AdRotator Control.
14. Explain calendar control and HiddenField Control.
15. Explain Grid view Control.
16. Explain FormView Control.
17. Explain DetailView Control.
18. Explain Repeater control with example.
19. What is CSS? Discuss how CSS is more powerful than HTML formatting?
20. What is Validation Control? Explain required field Validator and Regular expression Validator in detail.
21. Explain Compare and Range Validator with suitable example.
22. What is Validation summary? Explain its use with its properties.
23. Explain Page Life Cycle in detail.
24. What are cookies? Explain in detail
25. What is master page? Why we need it? Explain briefly about nested Master Page.
26. Explain SiteMapPath control in detail with example.
27. Explain Tree Control in detail with suitable example.
28. Explain Menu control in detail with suitable example.
29. What is Navigation Control? Explain their use with suitable example.
30. Explain QueryString in detail with example.
31. Explain the Feature of ASP.NET in detail.
32. What is Exception? Explain Exception handling with suitable example.
33. What is Method Overriding? Write a simple program to demonstrate the use of Method Overriding
34. What is Method Overloading? How they differ from method overriding? Write a simple program to demonstrate the use of Method Overloading.
35. What is Partial Class? Write a program to demonstrate the use of partial class.
36. What is Constructor? Explain different types of contractor in detail.
37. What is Inheritance? Explain different types of inheritance in detail.
38. Write a program to create your own exception and handled it.
39. Explain the use of Throws in detail with suitable program.
40. Explain the following Control in detail: A) Button B) LinkButton

41. Explain the following Control in detail: A) TextBox B)Label
42. Explain the following Control in detail: A) CheckBox B)CheckboxList
43. Explain the following Control in detail: A) RadioButton B)RadioButtonList
44. Explain the following Control in detail: A) ListBok B)DropDownList
45. Explain the FileUploader Control in detail with suitable program.
46. Explain the following Control in detail: A) Image B)Imagemap C) Hyperlink
47. Explain .NET framework in detail.
48. What is Properties? Explain the use of different types of properties with suitable program.
49. Explain different version of ASP.NET with their features in detail.
50. What is access specifier? Explain their use in detail with suitable example.

M.Sc. Computer Science Semester - II

Subject - Advance java

Section-A

Multiple choice/Very short type questions

1. Java is a language.
 - a) A.weakly typed
 - b) B.strogly typed
 - c) C.moderate typed
 - d) D.None of these
2. How many primitive data types are there in Java?
 - a) 6
 - b) 7
 - c) 8
 - d) 9
3. In Java byte, short, int and long all of these are
 - a) signed
 - b) unsigned
 - c) Both of the above
 - d) None of these
4. Size of int in Java is
 - a) 16 bit
 - b) 32 bit
 - c) 64 bit
 - d) Depends on execution environment
5. In Java arrays are
 - a) objects
 - b) object references
 - c) primitive data type
 - d) None of the above
6. Select from among the following character escape code which is not available in Java.
 - a) \t
 - b) \r
 - c) \a
 - d) \\
7. Which of the following class definitions defines a legal abstract class?
 - a) `class A { abstract void unfinished() { } }`
 - b) `class A { abstract void unfinished(); }`
 - c) `abstract class A { abstract void unfinished(); }`
 - d) `public class abstract A { abstract void unfinished(); }`
8. Which of the following declares an abstract method in an abstract Java class?
 - a) `public abstract method();`
 - b) `public abstract void method();`

- c) `public void abstract Method();`
 - d) `public void method() {}`
 - e) `public abstract void method() {}`
9. Which of the following statements regarding abstract classes are true?
- a) An abstract class can be extended.
 - b) A subclass of a non-abstract superclass can be abstract.
 - c) A subclass can override a concrete method in a superclass to declare it abstract.
 - d) An abstract class can be used as a data type.
 - e) All of the above
10. Suppose A is an abstract class, B is a concrete subclass of A, and both A and B have a default constructor. Which of the following is correct?
- 1. `A a = new A();`
 - 2. `A a = new B();`
 - 3. `B b = new A();`
 - 4. `B b = new B();`
- a) 1 and 2
 - b) 2 and 4
 - c) 3 and 4
 - d) 1 and 3
11. In Java, declaring a class abstract is useful
- a) To prevent developers from further extending the class.
 - b) When it doesn't make sense to have objects of that class.
 - c) When default implementations of some methods are not desirable.
 - d) To force developers to extend the class not to use its capabilities.
12. Which two of the following are legal declarations for abstract classes and interfaces?
- 1. `final abstract class Test {}`
 - 2. `public static interface Test {}`
 - 3. `final public class Test {}`
 - 4. `protected abstract class Test {}`
 - 5. `protected interface Test {}`
 - 6. `abstract public class Test {}`
- a) 1 and 2
 - b) 2 and 4
 - c) 3 and 5
 - d) 3 and 6
13. Runnable is a _____ .
- a) class
 - b) abstract class
 - c) interface
 - d) variable
14. The class at the top of exception class hierarchy is

- a) ArithmeticException
 - b) Throwable
 - c) Object
 - d) Exception
15. In which of the following package Exception class exist?
- a) java.util
 - b) java.file
 - c) java.io
 - d) java.lang
 - e) java.net
16. Exception generated in try block is caught in block.
- a) catch
 - b) throw
 - c) throws
 - d) finally
17. Which keyword is used to explicitly throw an exception?
- a) try
 - b) throwing
 - c) catch
 - d) throw
18. Which exception is thrown when divide by zero statement executes?
- a) A.NumberFormatException
 - b) B.ArithmeticException
 - c) C.NullPointerException
 - d) D.None of these
19. What happen in case of multiple catch blocks?
- a) Either super or subclass can be caught first.
 - b) The superclass exception must be caught first.
 - c) The superclass exception cannot caught first.
 - d) None of these
20. Which is true?
- a) A."X extends Y" is correct if and only if X is a class and Y is an interface
 - b) B."X extends Y" is correct if and only if X is an interface and Y is a class
 - c) C."X extends Y" is correct if X and Y are either both classes or both interfaces
 - d) D."X extends Y" is correct for all combinations of X and Y being classes and/or interfaces
21. System class is defined in
- a) java.util package
 - b) java.lang package
 - c) java.io package
 - d) java.awt package
22. Which of these classes defined in java.io and used for file-handling are abstract?

A. InputStream B. PrintStream C. Reader D. FileInputStream E. FileWriter

- a) Only A
- b) Only C
- c) A and C
- d) B and D

23. When comparing java.io.BufferedWriter and java.io.FileWriter, which capability exist as a method in only one of two ?

- a) closing the stream
- b) flushing the stream
- c) writing to the stream
- d) writing a line separator to the stream

24. State if it is true or false.

- i) Java beans slow down software development process.
- ii) Java Servlets does not have built in multithreading feature.

- a) i-false, ii-false
- b) i-false, ii-true
- c) i-true, ii-false
- d) i-true, ii-true

25. State if it is true or false.

- i) init() of servlet is called after a client request comes in
- ii) Servlets are ultimately converted into JSP

- a) i-false, ii-false
- b) i-false, ii-true
- c) i-true, ii-false
- d) i-true, ii-true

26. Match the following.

- | | |
|----------|---|
| a) Java | 1) is a tool for debugging java program |
| b) Javah | 2) is a tool for creating C-like header files |
| c) Javap | 3) runs java bytecode |
| d) jdb | 4) prints java code representation |

- a) a-3, b-2,c-1
- b) a-3, b-2, c-4, d-1
- c) a-1, b-2, c-3, d-4
- d) a-2, b-1, c-3, d-4

27. State if it is true or false.

- i) init() is called after start() in applet
- ii) applets are used for networking
- iii) inheritance is a part of Java Foundation Classes
- iv) final does not prevent inheritance

- a) i-true, ii-true, iii-false, iv-true
- b) i-false, ii-false, iii-false, iv-false
- c) i-true, ii-true, iii-true, iv-true

- d) i-true, ii-false, iii-false, iv-false
28. The ____ and the ____ classes are abstract classes supporting reading and writing of the byte streams.
- a) reader, writer
 - b) inputstream, outputstream
 - c) objectinputstream, objectoutputstream
 - d) none
29. A package is a collection of?
- a) classes
 - b) interfaces
 - c) editing tools
 - d) classes and interfaces
30. Which methods belong to string class?
- a) length()
 - b) compare To ()
 - c) equals ()
 - d) All of them
31. Which of the control expressions are valid when it comes to if statement?
- a) An integer expression
 - b) A Boolean expression
 - c) Either A or B
 - d) Neither A nor B
32. The concept of the multiple inheritance is being implemented in the Java by?
- a) extending two or more classes
 - b) extending one class and implementing one or more interfaces
 - c) implementing two or more interfaces
 - d) both b and c
33. Why Java and JavaScript have same name?
- a) JavaScript works as a version stripped-down of the Java
 - b) Both are originated in island of the Java
 - c) Javascript's syntax is based on the Java's
34. If you will view the JavaScript page, which machine will execute the so called script?
- a) Machine running the online browser
 - b) Central machine within the Netscapes corporate offices
 - c) Web server
35. ____JavaScript is referred as client-side.
- a) Livewire
 - b) Native
 - c) Microsoft
36. What variables are being used in the programs for the JavaScript?
- a) Dates, stronging numbers and others
 - b) Algebra flashbacks

- c) Varying randomly
37. ____ JavaScript statement embedded in the HTML page responding to the user events?
- a) Server-side
 - b) Native
 - c) Client-side
38. What cannot be done in the client-side of the JavaScript?
- a) Storing forms contents to file database on server
 - b) Sending forms contents
 - c) Validating form
39. Which are the capabilities functions in the JavaScript?
- a) Accept parameters
 - b) Return the value and accept parameters
 - c) Return the value
40. Which is invalid variable name of JavaScript?
- a) First and last names
 - b) First and last
 - c) names
41. ____ tag is the extension to the HTML enclosing number of the JavaScript statement.
- a) <SCRIPT>
 - b) <TITLE>
 - c) <HEAD>
 - d)
42. How the JavaScript store dates in date object?
- a) The number of the milliseconds since 1st January 1970
 - b) The number of the days since 1st January 1900
 - c) No answer
43. Which attribute will able to hold JavaScript version?
- a) LANGUAGE
 - b) VERSION
 - c) SCRIPT
44. What JavaScript syntax is correct in writing the "Hello World"?
- a) println ("Hello World")
 - b) System.out.println("Hello World")
 - c) document.write("Hello World")
45. Which best describes the JavaScript?
- a) a scripting language precompiled in the browser.
 - b) a compiled scripting language.
 - c) an object-oriented scripting language.
46. Choose the JavaScript object server-side?
- a) File
 - b) Date
 - c) FileUpLoad

47. Choose the client-side JavaScript object?
- a) Database
 - b) Client
 - c) FileUpload
48. JavaScript is interpreted by the?
- a) Server
 - b) Client
 - c) Object
49. In JavaScript, the _____ is object of target language data type enclosing the object of source language.
- a) a form
 - b) a wrapper
 - c) a cursor
50. When the JavaScript object is being sent to the Java, the runtime engine will create a Java wrapper of what type?
- a) ScriptObject
 - b) JavaObject
 - c) JSObject
51. The _____ class is providing interface that invokes JavaScript methods as well as examining JavaScript properties.
- a) ScriptObject
 - b) JSObject
 - c) Jobject
52. The _____ is a wrapped Java array that accessed from JavaScript code.
- a) JavaPackage
 - b) JavaArray
 - c) JavaObject
53. The _____ object is reference to 1 of classes in the Java package like netscape.javascript .
- a) JavaClass
 - b) JavaPackage
 - c) JavaObject
54. Define the meaning of "this" keyword in the javascript?
- a) It refers to the current object
 - b) It's variable containing value
 - c) It refers to the previous object
55. The JDBC-ODBC bridge allows _____ to be used as_____.
- a) ODBC drivers, JDBC drivers
 - b) Application, drivers
 - c) ODBC drivers, JDBC drivers
 - d) drivers, application
56. Which is true about Java.
- a) Java doesn't support the overloading.

- b) Java has replaced the destructor function of the C++
 - c) There are no any header files in the Java.
 - d) All of the above.
57. _____ are not machine instructions and the Java interpreter generate machine codes that is directly executed by machine running the Java program.
- a) aCompiled Instructions
 - b) Compiled code
 - c) byte code
 - d) Java mid code
58. The command javac
- a) Converts the java program to binary code
 - b) Converts the java program to bytecode
 - c) Converts the java program to machine language
 - d) All of the above.
59. Which is not primitive type of Java
- a) Float
 - b) Byte
 - c) Character
 - d) Long double
60. Command to execute compiled java program is?
- a) java
 - b) run
 - c) javac
 - d) javaw
61. Java Servlet?
- i) is key component of server side java development
 - ii) is a small pluggable extension to a server that enhances functionality
 - iii) runs only in Windows Operating System
 - iv) allows developers to customize any java enabled server
- a) i, ii & iii are ture
 - b) i, iii & iv are true
 - c) ii, iii & iv are true
 - d) i, ii & iv are true()
62. Inner classes are?
- a) anonymous classes
 - b) nested classes
 - c) sub classes
 - d) derived classes
63. State if the statement is true or false for EJB.
1. EJB exists in the middle-tier()
 2. EJB specifies an execution environment
 3. EJB supports transaction processing

- a) 1-true, 2. true, 3. True
 - b) 1- true, 2. false, 3. True
 - c) 1- false, 2- false, 3- false
 - d) 1-true, 2-true, 3-false
64. Prepared statement object in the JDBC is being used to ins executing ____ queries
- a) Executable
 - b) simple
 - c) high level
 - d) parameterized
65. In JDBC, ____ imports all Java classes that is concerned with the database connectivity.
- a) javax.sql.*
 - b) java.mysql.*
 - c) java.sql.*
 - d) com.*
66. MS-SQL is storing data in _____ file format.
- a) .DAT
 - b) .MDB
 - c) .MSSQL
 - d) .OBJ
67. Ingres is a?
- a) Socket
 - b) Compiler
 - c) Database
 - d) Web server
68. In Java servlet method init() is called _____ times.
- a) 1
 - b) 2
 - c) 0
 - d) multiple
69. State if it is true or false for Java Program.
- i) All class variables are instance variables
 - ii) All protected methods are friendly methods
- a) i-false, ii-false
 - b) i-false, ii-true
 - c) i-true, ii-false
 - d) i-true, ii-true
70. State true or false for Java Program.
- i) Data members of an interface are by default final
 - ii) An abstract class has implementations of all methods defined inside it.
- a) i-false, ii-false
 - b) i-false, ii-true
 - c) i-true, ii-false

- d) i-true, ii-true
71. The _____ of remotely accessible object should implement?
- a) all methods, RemoteException
 - b) class, RemoteException
 - c) class, RemoteInterface
 - d) all methods, RemoteInterface
72. The _____ is the key to_____.
- a) Serialization, persistence
 - b) Persistence, inheritance
 - c) Inheritance, object
 - d) Persistence, serialization
73. A method name myMethod() that needs 2 integer arguments is declared as?
- a) public void myMethod();
 - b) public void myMethod(int a, int b);
 - c) public void myMethod(int a, b);
 - d) public int myMethod(a, b);
74. JSP embeds in_____ in _____.
- a) Servlet, HTML
 - b) HTML, Java
 - c) HTML, Servlet
 - d) Java, HTML
75. The class at top of the exception class hierarchy is?
- a) ArithmeticException
 - b) Throwable
 - c) Class
 - d) Exception
76. In the java program, the package declaration _____ import statements.
- a) must precede
 - b) must succeed
 - c) may precede or succeed
 - d) none
77. Class string belongs to the _____package.
- a) java.awt
 - b) java.lang
 - c) java.applet
 - d) java.string
78. _____package is being used by the compiler itself. So, it doesn't need to be imported for use.
- a) java.math
 - b) java.awt
 - c) java.applet
 - d) java.lang

Answer:- 1.b 2.c 3.a 4.b 5.a 6.c 7.c 8.b 9.e 10.b 11.b 12.e 13.c 14.b 15.d 16.a
17.d 18.b 19.c 20.c 21.b 22.c 23.d 24.a 25.a 26.b 27.b 28.b 29.d 30.d 31.b
32.b 33.c 34.a 35.a 36.a 37.c 38.a 39.a 40.c 41.a 42.a 43.a 44.c 45.b 46.a
47.c 48.b 49.b 50.c 51.b 52.b 53.a 54.a 55.c 56.d 57.c 58.b 59.d 60.a
61.d 62.b 63.a 64.d 65.c 66.a 67.c 68.a 69.b 70.c 71.c 72.a 73.b 74.d 75.b
76.a 77.d 78.d

Section-B

Short answer type questions

1. What are JSP elements? Explain directive in this category?
2. Explain role of interceptors in struts?
3. What is progress bar in swing? Explain importance of it with code specification?
4. Explain the local and remote interface view strategy of EJB?
5. Explain about creation of table in swing?
6. Explain about the usage of JSplitPane component?
7. Explain the concept of JColorChoose in brief? Illustrate with example?
8. "Swing components are lightweight components"-Explain this statement?
9. Explain how to create dialogue boxes such as message box and input box?
10. Explain about the creation of "hierarchical tree structure" of swing?
11. What is CGI? What are the issues that it has? Explain?
12. Explain the life cycle phase of servlet.
13. Write a servlet that prints the reverse of the given number?
14. Write an exhaustive note on "HTTP session".
15. How a servlet does redirection of pages? Add suitable illustration to it.
16. Write a servlet to find the cube root of given number.
17. Write the advantage of JDBC API.
18. Explain how to insert dynamic values onto the backend table. Which subclass of the statement is used for the same?
19. Explain how JSP works.
20. Write a JSP to find the square root of given number. Accept number through html.
21. Explain <jsp:usebean>, one of the action tags of JSP.
22. Explain the term "Character quoting conversion".
23. What is JSF? Explain the features of JSF 2.0?
24. Explain the concept of result interface.
25. Write a short note on EJB container?
26. What are different types of EJB? Explain.
27. What is facade? How is it controlled by facade controller?
28. What are the advantages of EJB? Explain.
29. What is struts? Explain the application flow of MVC pattern of struts.
30. Explain the role of OGNL in struts.
31. Explain the relationship between hibernate application and the database.

32. Give the code specification of hibernate.cfg.xml that holds the connection details of customer table of company database.
33. Create a simple struts application that prints the result page from an appropriate action.
34. Explain the significance of hibernate framework.
35. Explain the concept of resource injection.
36. Draw and explain the architecture of web services.
37. What are the contents of Java mail API? Explain.
38. Explain the significance of JNDI.
39. Write a session bean java source code to send the mail to the given recipient.
40. How to access web services that we created already? Explain the steps involved in creating the client.
41. (Q.41) What is event? List various event classes in java. Explain any two event classes.
42. (Q.42) What is use of adapter class? Explain with suitable example.
43. (Q.43) List various layouts used in java. Explain any two with example.
44. (Q.44) Write AWT based java program that will read a number from user (TextBox) and display its factorial (Label).
45. (Q.45) How message box is displayed in java? Give an example.
46. (Q.46) Differentiate between JTextArea, JPasswordField, JTextField?
47. Write the purpose of following methods of servlet interface (i) Init (ii) Destroy (iii) service (iv) getServletConfig (v) getServletInfo
48. What are the merits and demerits of servlets?
49. Write various classes used in JDBC. Also write the purpose of each.
50. How result of a query is processed in JDBC? Explain with suitable example.
51. List and explain JSP directives.
52. Explain the include and forward action element of JSP.
53. Write the benefits of EJB?
54. What is facelets? Write the features of Facelets.
55. Explain the architecture of hibernate with suitable example.
56. What is importance of hibernate mapping file? Explain with suitable example.
57. Write AWT based java program that demonstrate the use of textbox, label, checkbox.
58. List various classes of Servlet API. Write the purpose of each.
59. What are the different type of statements in JDBC? Explain.
60. What is garbage collection? Write advantages.

Section-C

Long answer type questions

1. Give an overview of Java. Explain JDK, JRE, and JVM with diagram?
2. Write down the different kinds of primitive data types of java.
3. Explain different kinds of operators and control statements in java with examples.
4. Define classes, objects, abstract class, packages, interfaces. Explain super, this, final, static keywords.
5. Explain polymorphism with example.

6. Explain inheritance concept in java with example.
7. Describe method overloading and method overwriting? Illustrate each with example.
8. Explain multithreading and exception handling.
9. What are the java packages? Give an brief overview on java.lang, java.util, java.io packages.
10. Explain RMI architecture. Also describe each layer function?
11. Explain MVC architecture.
12. Explain types of exceptions with example.
13. Write a note on event delegation model.
14. Write a note on layout managers.
15. Why servlet are preferred over CGI? Write a servlet that prints reverse of given number.
16. Explain life cycle of servlet. Write a servlet that prints the sum of cube of given number.
17. Explain HttpServletRequest interface. Explain the importance of requestdispatcher of servlet in interservlet communication.
18. What is directives? Explain page directives. Explain <jsp:include> and <jsp:forward> action tags.
19. Explain JDBC architecture in detail.
20. Write a short note on "ResultSetMetadata"?
21. How to create directory like structure in swing? Explain with illustration.
22. What is MVC pattern? How do JSF claim that it follows MVC?
23. Explain the lifecycle phases of JSF and Explain any four phases in detail.
24. Explain the advantages of EJB? Classify the enterprise beans. Explain its types?
25. List out any four methods of hash map class.
26. List out any four methods of enumeration interface.
27. Write a note on JDBC drivers?
28. What is interthread communication? Which methods are used for interthread communication?
29. Write a note on thread lifecycle?
30. What is port? Name some default port names.
31. What is URL? Explain different types of URL.
32. Write a note on Rules for writing Java bean class.

33. Write a note on Beans persistence.

34. What are struts? Why is it required? Enlist core components of struts and explain about interceptors.
35. Explain the importance of mapping and show the creation of mapping file in hibernate framework.
36. Explain the architecture and process flow of hibernate framework in detail.
37. Write a short note on resource injection. Explain the components of web services.

38. Enlist and explain the components of java mail API that helps in reading the contents of the mail from inbox folder.
39. What are web services? Explain the components of web services? State the importance of the same.
40. How to access web services that we already created. What are the steps in creating client? Explain the need of directory services in detail.
41. What are the advantages or disadvantages of using JDBC over ODBC?
42. Explain java servlet architecture.
43. Describe manifest file of java beans? And explain the concept of introspection of the bean.
44. Describe various implicit objects of the JSP. What is the scope of those objects?
45. What is meant by design pattern of the beans? And explain simple, boolean, and indexed property types that support design patterns?
46. What are the seven basic steps for using JDBC to access a database? Explain briefly with syntax.
47. Explain mutator and accessor methods that are used to define properties of the beans?
48. What are the various JSP tags available?
49. What are the constrained properties of beans?
50. What is a cookie? What is the need for session tracking in the servlet? What are the different techniques for session tracking?
51. What is JAR file? What are the options available with JAR files? List any five.
52. Explain JSP? What are the advantages of using JSP over servlets?
53. Explain JSP access models and session management using JSP?
54. Write short notes on JTabbedPane, JTable, JButton?
55. According to JSP terminology, how do you forward a page request?
56. Explain the synchronisation issue of servlet.
57. Explain following concepts (i) Beans API (ii) JS API (iii) JScrollPane (iv) Prepared statement of jdbc (v) redirection of server pages in servlets
58. Compare Swing and AWT?
59. Compare JSP and ASP?
60. Explain protocol dependent and protocol independent servlet?

M.Sc. Computer Science Semester - II

Subject - Advanced Operating System

Section-A

Multiple choice/Very short type questions

1. Logical extension of computation migration is
 - a) process migration
 - b) system migration
 - c) thread migration
 - d) data migration
2. Network operating system runs on
 - a) server
 - b) every system in the network
 - c) both server and every system in the network
 - d) none of the mentioned
3. Which routing technique is used in distributed system?
 - a) fixed routing
 - b) virtual routing
 - c) dynamic routing
 - d) all of the above
4. The capability of a system to adapt the increased service load is called
 - a) scalability
 - b) tolerance
 - c) capacity
 - d) none of the mentioned
5. Internet provides _____ for remote login.
 - a) telnet
 - b) http
 - c) ftp
 - d) RPC
6. Process is
 - a) program in high level language
 - b) contents in main memory
 - c) a program in execution
 - d) a job in secondary memory
7. A system program that combines the separately compiled modules of a program into a form suitable for execution is
 - a) assembler
 - b) linking loader
 - c) compiler
 - d) none of the above
8. To avoid the race condition, the number of processes that may be simultaneously inside their critical section is

- a) 8
 - b) 1
 - c) 16
 - d) 0
9. CPU performance is measured through
- a) Throughput
 - b) Mhz
 - c) Both a and b
 - d) None of the above
10. Information about a process is stored in
- a) Stack
 - b) Translation look aside buffer
 - c) Process Control Block
 - d) Program Control Block
11. IPC stands for
- a) intellectual process community
 - b) Inter-Personal Communication
 - c) Inter-Process Communication
 - d) Inter-Personal Community
12. If process p_i is executing in its critical section, then no other process can enter into the critical section, this is called
- a) Mutual Exclusion
 - b) Bounded Waiting
 - c) Progress
 - d) None of the above
13. What is Operating system?
- a) Collection of programs that manages hardware resources
 - b) System service provider to the application program
 - c) Link to interface the hardware and application program
 - d) All of the above
14. Transparency that enables multiple instances of resources to be used, is called
- a) Replication transparency
 - b) Scaling transparency
 - c) Concurrency transparency
 - d) Performance transparency
15. A paradigm of multiple autonomous computers, having a private memory, communicating through a computer network, is known as
- a) Distributed computing
 - b) Cloud computing
 - c) Centralized computing
 - d) Parallel computing
16. HTC stands for

- a) High-turning computing
 - b) High-tabulation computing
 - c) High-technology computing
 - d) High-throughput computing
17. All resources are shared and integrated within one OS, in computing paradigm named
- a) Distributed computing
 - b) Parallel computing
 - c) Cloud computing
 - d) Centralized computing
18. In a distributed system, information is exchanged through
- a) Memory sharing
 - b) Process sharing
 - c) Message passing
 - d) Exceptions
19. All resources are tightly coupled in computing paradigm of
- a) Cloud computing
 - b) Centralized computing
 - c) Distributed computing
 - d) Parallel computing
20. A set of highly integrated machines that run same process in parallel is known to be
- a) Tightly coupled
 - b) Loosely coupled
 - c) Space based
 - d) Peer-to-Peer
21. Distributed operating system works on the principle.
- a) Multi image
 - b) single system image
 - c) network image
 - d) file image
22. Distributed systems have
- a) High security
 - b) Better resource sharing
 - c) Low system overhead
 - d) None of the above
23. In distributed system each processor has its own
- a) Local memory
 - b) Clock
 - c) Both local memory and clock
 - d) None of the mentioned
24. What is not a major reason for building distributed systems?
- a) Resource sharing
 - b) Computation speedup
 - c) Reliability

- d) Simplicity
25. How many layers does internet model OSI consists of?
 - a) Three
 - b) Five
 - c) Seven
 - d) Eight
 26. Which layer is responsible for process to process delivery?
 - a) Network
 - b) Transport
 - c) Physical
 - d) Data link
 27. In distributed system, logical clock is associated with
 - a) Each instruction
 - b) Each process
 - c) Each register
 - d) None of the mentioned
 28. In the token passing approach of distributed systems, processes are organized in a ring structure
 - a) Logically
 - b) Physically
 - c) Both logically & physically
 - d) None of the mentioned
 29. In case of failure, a new transaction coordinator can be elected by
 - a) Bully algorithm
 - b) Ring algorithm
 - c) Both bully and ring algorithm
 - d) None of the mentioned
 30. Which are the two complementary deadlock-prevention schemes using time stamps ?
 - a) The wait-die & wound-wait scheme
 - b) The wait-n-watch scheme
 - c) The wound-wait scheme
 - d) The wait-wound & wound-wait scheme
 31. The crossbar switch requires-crosspoint switches.
 32. The omega network requiresswitches.
 33. In ATM, VCI is abbreviated as
 34. In ATM, VPI is abbreviated as
 35. ATM is an ITU-T standard for relay.
 36. AAL3/4 supports both and data.
 37. supports connectionless data transfer or unspecified bit rate.
 38. The general approach to fault tolerance is to use
 39. Threads are invented to allow

Answer: 1.a 2.a 3.d 4.a 5.a 6.c 7.b 8.b 9.b 10.c 11.c 12.a 13.d 14.a 15.a 16.c 17.d
18.c 19.b 20.a 21.b 22.b 23.c 24.d 25.c 26.b 27.b 28.a 29.c 30.a
31. n^2
32. $(n \log_2 n)/2$
33. Virtual Channel Identifier
34. Virtual Path Identifier
35. cell
36. connection oriented, connectionless
37. AAL5
38. redundancy
39. parallelism

40. Write full form of ATM.
41. Write the full form of OSI model.
42. Write the full form of TCP/IP.
43. Write the full form of RPC.
44. Write full form of ACID.

Section-B

Short answer type questions

1. What is distributed system?
2. What are the goals of distributed system?
3. What are the disadvantages of distributed systems?
4. Name the two essential characteristics that Flynn's considered for classification of computer.
5. What is the difference between multiprocessor and multicomputer?
6. What is snoopy cache?
7. What do you mean by tightly coupled systems?
8. What do you mean by loosely coupled systems?
9. Explain the difference between crossbar switch and an omega switching network.
10. Explain the advantages and disadvantages of crossbar switch.
11. Explain an omega switching network.
12. What do you mean by single system image?
13. Explain different kinds of transparency in a distributed system.
14. What is location transparency in distributed system?
15. What is migration transparency in distributed system?
16. What is replication transparency in a distributed system?
17. What is concurrency transparency in a distributed system?
18. What is parallelism transparency in a distributed system?

19. What is the main difference between a distributed operating system and a network operating system?
20. What are the primary tasks of a microkernel?
21. Name two advantages of a microkernel over a monolithic kernel.
22. What do you mean by fine-grained parallelism?
23. What do you mean by coarse-grained parallelism?
24. What is the difference between an MIMD computer and an SIMD computer?
25. Define operating system.
26. What is the primary goal of an operating system?
27. What is system call?
28. Define process.
29. Explain process state diagram.
30. Define PCB.
31. Define mutual exclusion.
32. Define critical section.
33. What is deadlock?
34. What is resource allocation graph?
35. Define file.
36. What are the attributes of file?
37. Explain common file types.
38. What is asynchronous transfer mode?
39. What is the difference between UNI and NNI?
40. What do you mean by LAN emulation?
41. Explain Payload Type field in the ATM frame format.
42. Explain HEC field in the ATM frame format
43. Explain different planes in ATM references model.
44. What do you mean by parameter marshalling?
45. Explain logical clock for synchronization in distributed system.
46. Explain Lamport's algorithm for synchronizing logical clocks.
47. Write brief description about physical clock.
48. Explain Cristian's algorithm for clock synchronization.
49. Explain Berkeley algorithm for clock synchronization.
50. Explain averaging algorithm for clock synchronization.
51. Explain the bully algorithm for electing a coordinator.
52. What is the goal of an election algorithm?
53. Explain a ring algorithm for electing a coordinator.
54. Explain four essential properties of transactions.
55. Define nested transaction.
56. Explain two-phase commit protocol.
57. Explain deadlocks in distributed systems.
58. What are the various strategies to handle deadlocks?
59. Explain centralized deadlock detection algorithm.

60. Explain distributed deadlock detection algorithm.
61. Explain distributed deadlock prevention algorithm.
62. Define thread.
63. Explain three organizations of threads in a process.
64. What are the design issues for thread packages?
65. Explain processor pool model in a distributed system.
66. Explain implementation issues for processor allocation algorithms.
67. Explain graph-theoretic deterministic algorithm for processor allocation.
68. Explain centralized algorithm for processor allocation.
69. Explain hierarchical algorithm for processor allocation.
70. Explain sender-initiated distributed heuristic algorithm for processor allocation algorithm
71. Explain receiver-initiated distributed heuristic algorithm for processor allocation.
72. Explain bidding algorithm for processor allocation.
73. Define fault.
74. What are the types of faults?
75. Define transient fault.
76. Define intermittent fault.
77. Define permanent fault.
78. What is the goal of fault-tolerant systems?
79. Name two types of faults in processor.
80. Define fail-silent fault.
81. Define byzantine fault.
82. What is shared memory?
83. Write three key properties of NUMA multiprocessors.
84. What are the primary goals of MACH system?
85. Write three function of the Amoeba microkernel.

Section-C

Long answer type questions

1. What are the advantages of distributed system over centralized system?
2. What are the advantages of distributed system over isolated (personal) computers?
3. Explain bus-based multiprocessor.
4. Explain switched multiprocessor.
5. Explain bus-based multicomputer.
6. Explain switched multicomputer.
7. Explain network operating system.
8. Explain true distributed operating system.
9. Explain multiprocessor time sharing system.
10. Compare network, distributed and multiprocessor operating system.
11. What are the key design issues for building a distributed operating system?

12. What are the potential bottlenecks that designers should try to avoid in very large distributed systems?
13. Explain types of operating system.
14. What operating systems do?
15. What are the services of operating system that are helpful to the user?
16. What are the necessary conditions for deadlock?
17. Explain banker's algorithm for deadlock avoidance.
18. Explain the benefits of ATM.
19. Explain ATM cell format with suitable diagram.
20. Explain ATM reference model.
21. Explain OSI model.
22. Explain ATM physical layer.
23. Explain ATM adaptation layer.
24. Explain ATM switching.
25. What are the applications of ATM?
26. Explain client server model.
27. Explain addressing scheme of client server model.
28. Explain blocking versus non-blocking primitives in client server model.
29. Explain buffered versus unbuffered primitives in client server model.
30. Explain reliable versus unreliable primitives in client server model.
31. Explain remote procedure call.
32. What are the five different classes of failure that can occur in RPC system?
33. What are the steps in a remote procedure call?
34. Explain critical path from client to server in RPC.
35. What is group communication?
36. What are the design issues in group communication?
37. What are the general properties of distributed systems?
38. Explain clock synchronization algorithms in detail.
39. Explain centralized algorithm to achieve mutual exclusion in a distribution system.
40. How do we achieve mutual exclusion in a distributed system?
41. Explain distributed algorithm to achieve mutual exclusion in a distributed system.
42. Explain a token ring algorithm to achieve mutual exclusion in a distributed system.
43. Compare the mutual exclusion algorithms.
44. What are the methods for implementing transactions?
45. Explain Chandy-Misra-Hass algorithm for distributed deadlock detection.
46. What are the design issues for processor allocation algorithms?
47. Explain disk usage on workstations.
48. Explain registry-based algorithm for finding and using idle workstations.
49. Explain NUMA multiprocessor.
50. Explain bus-based multiprocessor.
51. Explain ring-based multiprocessor.
52. Explain switched multiprocessor.

53. Explain architecture of the amoeba system.
54. Explain architecture of a MACH system.

M.Sc. Computer Science Semester - II
Subject - Advanced Database Management System

Section-A

Multiple choice/Very short type questions

1. Which of the following is not the characteristics of DBMS
 - a) Integrity
 - b) Atomicity
 - c) Easy to access
 - d) Redundancy
2. Which of the following is not a type of database user
 - a) Naïve User
 - b) Application Programmer
 - c) DBA
 - d) Designer
3. Which of the following is not a type of key
 - a) Primary Key
 - b) Unique Key
 - c) Candidate key
 - d) Multi-user Key
4. Data Base Management System (DBMS) is
 - a) Collection of interrelated data
 - b) Collection of programs to access data
 - c) Both A & B
 - d) None
5. Which of the following is not a level of data abstraction
 - a) Physical Level
 - b) View Level
 - c) Critical level
 - d) Logical level
6. In ER diagram, rectangle represents
 - a) Entity
 - b) Attribute
 - c) Relation
 - d) Cardinality
7. Which of the following is not a component of ER Diagram?
 - a) Entity
 - b) Relation
 - c) Attribute
 - d) Operator
8. Which of the following is database language
 - a) DDL
 - b) DML
 - c) Query Language
 - d) All of the above
9. high level of RAID refers to disk mirroring with block striping?
 - a) RAID level 1
 - b) RAID level 2

- c) RAID level 0
 - d) RAID level 3
10. A unit of storage that can store one or more records in a hash file organization is denoted as
- a) Buckets
 - b) Disk pages
 - c) Blocks
 - d) Nodes
11. What are the correct features of a distributed database?
- a) Is always connected to the internet
 - b) Always requires more than three machines
 - c) Users see the data in one global schema.
 - d) Have to specify the physical location of the data when an update is done
12. Which level of RAID refers to disk mirroring with block striping?
- a) RAID level 1
 - b) RAID level 2
 - c) RAID level 0
 - d) RAID level 3
13. With multiple disks, we can improve the transfer rate as well by _____ data across multiple disks.
- a) Striping
 - b) Dividing
 - c) Mirroring
 - d) Dividing
14. Which one of the following is a Stripping technique ?
- a) Byte level stripping
 - b) Raid level stripping
 - c) Disk level stripping
 - d) Block level stripping
15. The RAID level which mirroring is done along with stripping is
- a) RAID 1+0
 - b) RAID 0
 - c) RAID 2
 - d) Both RAID 1+0 and RAID 0
16. Where performance and reliability are both important, RAID level ____ is used.
- a) 0
 - b) 1
 - c) 2
 - d) 0+1
17. _____ partitiones data and parity among all N+1 disks, instead of storing data in N-disks and parity in one disk.
- a) Block interleaved parity
 - b) Block interleaved distributed parity
 - c) Bit parity
 - d) Bit interleaved parity

18. Hardware RAID implementations permit _____ that is, faulty disks can be removed and replaced by new ones without turning power off.
- Scrapping
 - Swapping
 - Hot swapping
 - None of the mentioned
19. _____ is popular for applications such as storage of log files in a database system, since it offers the best write performance.
- RAID level 1
 - RAID level 2
 - RAID level 0
 - RAID level 3
20. _____ which increases the number of I/O operations needed to write a single logical block, pays a significant time penalty in terms of write performance.
- RAID level 1
 - RAID level 2
 - RAID level 5
 - RAID level 3
21. If a piece of data is stored in two places in the database, then
- Storage space is wasted
 - Changing the data in one spot will cause data inconsistency
 - It can be more easily accessed
 - Storage space is wasted & Changing the data in one spot will cause data inconsistency
22. Which of the following hardware component is the most important to the operation of database management system?
- High resolution video display
 - Printer
 - High speed, large capacity disk
 - Mouse
23. Which of the following is not true of the traditional approach to information processing
- There is common sharing of data among the various applications
 - It is file oriented
 - Programs are dependent on the file
 - It is inflexible
24. Which of these is not a feature of Hierarchical model?
- Organizes the data in tree-like structure
 - Parent node can have any number of child nodes
 - Root node does not have any parent
 - Child node can have any number of parent nodes
25. The information about data in a database is called _____
- Metadata
 - Hyper data
 - Tera data
 - None of the mentioned
26. A data dictionary is a special file that contains?
- The names of all fields in all files
 - The data types of all fields in all files

- c) The widths of all fields in all files
 - d) All of the mentioned
27. The DBMS acts as an interface between what two components of an enterprise-class database system?
- a) Database application and the database
 - b) Data and the database
 - c) The user and the database application
 - d) Database application and SQL
28. In ordered indices the file containing the records is sequentially ordered, a _____ is an index whose search key also defines the sequential order of the file.
- a) Clustered index
 - b) Structured index
 - c) Unstructured index
 - d) Nonclustered index
29. Indices whose search key specifies an order different from the sequential order of the file are called _____ indices.
- a) Nonclustered
 - b) Secondary
 - c) All of the mentioned
 - d) None of the mentioned
30. An _____ consists of a search-key value and pointers to one or more records with that value as their search-key value.
- a) Index entry
 - b) Index hash
 - c) Index cluster
 - d) Index map
31. A search key containing more than one attribute is referred to as a _____ search key.
- a) Simple
 - b) Composite
 - c) Compound
 - d) Secondary
32. In B+ tree the node which points to another node is called
- a) Leaf node
 - b) External node
 - c) Final node
 - d) Internal node
33. If h is any hashing function and is used to hash n keys in to a table of size m , where $n \leq m$, the expected number of collisions involving a particular key x is :
- a) Less than 1
 - b) Less than n
 - c) Less than m
 - d) Less than $n/2$
34. A technique for direct search is
- a) Binary Search
 - b) Linear Search
 - c) Tree Search
 - d) Hashin

35. The searching technique that takes $O(1)$ time to find a data is
- Linear Search
 - Binary Search
 - Hashing
 - Tree Search
36. The goal of hashing is to produce a search that takes
- $O(1)$ time
 - $O(n^2)$ time
 - $O(\log n)$ time
 - $O(n \log n)$ time
37. Consider a hash table of size seven, with starting index zero, and a hash function $(3x + 4) \bmod 7$. Assuming the hash table is initially empty, which of the following is the contents of the table when the sequence 1, 3, 8, 10 is inserted into the table using closed hashing? Note that ‘_’ denotes an empty location in the table.
- 8, _, _, _, _, _, 10
 - 1, 8, 10, _, _, _, 3
 - 1, _, _, _, _, _, 3
 - 1, 10, 8, _, _, _, 3
38. Key value pairs is usually seen in
- Hash tables
 - Heaps
 - Both Hash tables and Heaps
 - Skip list
39. What is the best definition of a collision in a hash table?
- Two entries are identical except for their keys
 - Two entries with different data have the exact same key
 - Two entries with different keys have the same exact hash value
 - Two entries with the exact same key have different hash values
40. The property (or set of properties) that uniquely defines each row in a table is called the:
- Identifier
 - Index
 - Primary key
 - Symmetric key
41. The separation of the data definition from the program is known as:
- Data dictionary
 - Data independence
 - Data integrity
 - Referential integrity
42. In the client / server model, the database:
- Is downloaded to the client upon request
 - Is shared by both the client and server
 - Resides on the client side
 - Resides on the server side
43. Consider money is transferred from (1) account-A to account-B and (2) account-B to account-A. Which of the following form a transaction ?
- Only 1

- b) Only 2
 - c) Both 1 and 2 individually
 - d) Either 1 or 2
44. A transaction is delimited by statements (or function calls) of the form _____
- a) Begin transaction and end transaction
 - b) Start transaction and stop transaction
 - c) Get transaction and post transaction
 - d) Read transaction and write transaction
45. Identify the characteristics of transactions
- a) Atomicity
 - b) Durability
 - c) Isolation
 - d) All of the mentioned
46. Which of the following has “all-or-none” property ?
- a) Atomicity
 - b) Durability
 - c) Isolation
 - d) All of the mentioned
47. The database system must take special actions to ensure that transactions operate properly without interference from concurrently executing database statements. This property is referred to as
- a) Atomicity
 - b) Durability
 - c) Isolation
 - d) All of the mentioned
48. The property of transaction that persists all the crashes is
- a) Atomicity
 - b) Durability
 - c) Isolation
 - d) All of the mentioned
49. _____ states that only valid data will be written to the database.
- a) Consistency
 - b) Atomicity
 - c) Durability
 - d) Isolation
50. Transaction processing is associated with everything below except
- a) Producing detail summary or exception reports
 - b) Recording a business activity
 - c) Confirming a action or triggering a response
 - d) Maintaining a data
51. The Oracle RDBMS uses the ____ statement to declare a new transaction start and its properties.
- a) BEGIN
 - b) SET TRANSACTION
 - c) BEGIN TRANSACTION
 - d) COMMIT

52. ____ means that the data used during the execution of a transaction cannot be used by a second transaction until the first one is completed.
- a) Consistency
 - b) Atomicity
 - c) Durability
 - d) Isolation
53. A transaction may not always complete its execution successfully. Such a transaction is termed
- a) Aborted
 - b) Terminated
 - c) Closed
 - d) All of the mentioned
54. If an transaction is performed in a database and committed, the changes are taken to the previous state of transaction by
- a) Flashback
 - b) Rollback
 - c) Both Flashback and Rollback
 - d) Cannot be done
55. Each modification done in database transaction are first recorded into the
- a) Harddrive
 - b) Log
 - c) Disk
 - d) Datamart
56. When the transaction finishes the final statement the transaction enters into
- a) Active state
 - b) Committed state
 - c) Partially committed state
 - d) Abort state
57. If the state of the database no longer reflects a real state of the world that the database is supposed to capture, then such a state is called
- a) Consistent state
 - b) Parallel state
 - c) Atomic state
 - d) Inconsistent state
58. _____ means that data used during the execution of a transaction cannot be used by a second transaction until the first one is completed.
- a) Serializability
 - b) Atomicity
 - c) Isolation
 - d) Time stamping
59. DBMS periodically suspends all processing and synchronizes its files and journals through the use of
- a) Checkpoint facility
 - b) Backup facility
 - c) Recovery manager
 - d) Database change log
60. Which of the following is not a state in transaction ?
- a) Active

- b) Terminated
 - c) Aborted
 - d) Partially committed
61. Optimization that is basically related to the rewriter module is termed as_____
- a) Semantic query optimization
 - b) Global query optimization
 - c) All of the Mentioned
 - d) None of the Mentioned
62. Which are types of recovery control techniques:
- a) Deferred update
 - b) Immediate update
 - c) All of the Mentioned
 - d) None of the Mentioned
63. Which of the following is not a property of transactions?
- a) Atomicity
 - b) Concurrency
 - c) Isolation
 - d) Durability
64. In order to maintain transactional integrity and database consistency, what technology does a DBMS deploy?
- a) Triggers
 - b) Pointers
 - c) Locks
 - d) Cursors
65. Which of the following are introduced to reduce the overheads caused by the log-based recovery?
- a) Checkpoints
 - b) Indices
 - c) Deadlocks
 - d) Locks
66. Which of the following protocols ensures conflict serializability and safety from deadlocks?
- a) Two-phase locking protocol
 - b) Time-stamp ordering protocol
 - c) Graph based protocol
 - d) None of the mentioned
67. Which of the following is the block that is not permitted to be written back to the disk?
- a) Dead code
 - b) Read only
 - c) Pinned
 - d) Zapped
68. All lock information is managed by a _____ which is responsible for assigning and policing the locks used by the transactions.
- a) Scheduler
 - b) DBMS
 - c) Lock manager
 - d) Locking agent

69. A system is in a _____ state if there exists a set of transactions such that every transaction in the set is waiting for another transaction in the set.
- Idle
 - Waiting
 - Deadlock
 - Ready
70. The deadlock state can be changed back to stable state by using _____ statement.
- Commit
 - Rollback
 - Savepoint
 - Deadlock
71. What are the ways of dealing with deadlock ?
- Deadlock prevention
 - Deadlock recovery
 - Deadlock detection
 - All of the mentioned
72. When transaction T_i requests a data item currently held by T_j , T_i is allowed to wait only if it has a timestamp smaller than that of T_j (that is, T_i is older than T_j). Otherwise, T_i is rolled back (dies). This is
- Wait-die
 - Wait-wound
 - Wound-wait
 - Wait
73. When transaction T_i requests a data item currently held by T_j , T_i is allowed to wait only if it has a timestamp larger than that of T_j (that is, T_i is younger than T_j). Otherwise, T_j is rolled back (T_j is wounded by T_i). This is
- Wait-die
 - Wait-wound
 - Wound-wait
 - Wait
74. The situation where the lock waits only for a specified amount of time for another lock to be released is
- Lock timeout
 - Wait-wound
 - Timeout
 - Wait
75. The deadlock in a set of transaction can be determined by
- Read-only graph
 - Wait graph
 - Wait-for graph
 - All of the mentioned
76. A deadlock exists in the system if and only if the wait-for graph contains a _____
- Cycle
 - Direction
 - Bi-direction
 - Rotation

77. rollback requires the system to maintain additional information about the state of all the running transactions.
- Total
 - Partial
 - Time
 - Commit
78. The log is a sequence of _____ recording all the update activities in the database.
- Log records
 - Records
 - Entries
 - Redo
79. In the _____ scheme, a transaction that wants to update the database first creates a complete copy of the database.
- Shadow copy
 - Shadow Paging
 - Update log records
 - All of the mentioned
80. The _____ scheme uses a page table containing pointers to all pages; the page table itself and all updated pages are copied to a new location.
- Shadow copy
 - Shadow Paging
 - Update log records
 - All of the mentioned
81. If a transaction does not modify the database until it has committed, it is said to use the _____ technique.
- Deferred-modification
 - Late-modification
 - Immediate-modification
 - Undo
82. If database modifications occur while the transaction is still active, the transaction is said to use the _____ technique.
- Deferred-modification
 - Late-modification
 - Immediate-modification
 - Undo
83. _____ using a log record sets the data item specified in the log record to the old value.
- Deferred-modification
 - Late-modification
 - Immediate-modification
 - Undo
84. In the _____ phase, the system replays updates of all transactions by scanning the log forward from the last checkpoint.
- Repeating
 - Redo
 - Replay
 - Undo

85. The recovery scheme must also provide
- a) High availability
 - b) Low availability
 - c) High reliability
 - d) High durability
86. Which one of the following is a failure to system
- a) Boot crash
 - b) Read failure
 - c) Transaction failure
 - d) All of the mentioned
87. Which of the following belongs to transaction failure
- a) Read error
 - b) Boot error
 - c) Logical error
 - d) All of the mentioned
88. Concept which checks syntax of query whether is written according to rules of grammar is classified as
- a) query graph
 - b) query tree
 - c) scanner
 - d) parser
89. Processor used to run code of queries of interpreted mode or compiled mode is classified as
- a) runtime database processor
 - b) query optimization processor
 - c) parser runtime processor
 - d) query graphic processor
90. Representation of query in form of data structure is classified as
- a) query graph
 - b) query tree
 - c) scanner tree
 - d) parser tree
91. Representation of queries in form of data structure graph is classified as
- a) scanner tree
 - b) parser tree
 - c) query graph
 - d) query tree
92. A distributed database has which of the following advantages over a centralized database?
- a) Software cost
 - b) Software complexity
 - c) Slow Response
 - d) Modular growth
93. Location transparency allows for which of the following?
- a) Users to treat the data as if it is at one location
 - b) Programmers to treat the data as if it is at one location
 - c) Managers to treat the data as if it is at one location
 - d) All of the above.

94. Some of the columns of a relation are at different sites is which of the following?
- Data Replication
 - Horizontal Partitioning
 - Vertical Partitioning
 - Horizontal and Vertical Partitioning
95. A homogenous distributed database is which of the following?
- The same DBMS is used at each location and data are not distributed across all nodes.
 - The same DBMS is used at each location and data are distributed across all nodes.
 - A different DBMS is used at each location and data are not distributed across all nodes.
 - A different DBMS is used at each location and data are distributed across all nodes.
96. Storing a separate copy of the database at multiple locations is which of the following?
- Data Replication
 - Horizontal Partitioning
 - Vertical Partitioning
 - Horizontal and Vertical Partitioning
97. Which of the following is a disadvantage of replication?
- Reduced network traffic
 - If the database fails at one site, a copy can be located at another site.
 - Each site must have the same storage capacity.
 - Each transaction may proceed without coordination across the network.
98. A distributed database can use which of the following strategies?
- Totally centralized at one location and accessed by many sites
 - Partially or totally replicated across sites
 - Partitioned into segments at different sites
 - All of the above

Section-B

Short answer type questions

- What is DBMS?
- What is the role of Database Administrator ?
- Disadvantage in File Processing System?
- Describe the three levels of data abstraction?
- Define the "integrity rules".
- What is extension and intension?
- What is Data Independence?
- What do you mean by Data processing ?
- Which part of the RDBMS takes care of the data dictionary? How?
- What do you mean by instance & schema ? Explain the difference between these.
- What is the difference between Procedural DML and Non-Procedural DML ?
- Discuss the process of disk initialization.
- Discuss the mechanism used to read data from or write data to the disk.
- How does double buffering improve block access time?
- What are the reasons for having variable-length records? What types of separator characters are needed for each?
- What is double buffering?
- What is interleaved execution?

18. Explain Fixed length records.
19. Explain variable length records.
20. What is blocking factor?
21. What are spanned records?
22. What are unspanned records?
23. What is file header? Explain
24. What is file Reorganization?
25. What is heap File organization?
26. What is hashing
27. What is collision?
28. What is internal Hashing?
29. What is external Hashing?
30. What is static hashing?
31. What is dynamic Hashing?
32. Explain stripping ?
33. Explain mirroring?
34. What is RAID?
35. What is RAID 1+0 level?
36. What is RAID 0+1 level?
37. What is bit level stripping?
38. What is block level stripping?
39. What is transaction?
40. Explain Read(X) and Write(X) operations in transaction.
41. Explain lost update problem.
42. Explain dirty read problem.
43. Explain incorrect summary problem.
44. Explain unrepeatable read problem.
45. What is schedule?
46. Explain recoverable schedules.
47. Explain non-recoverable Schedule.
48. What are the conflict operations? Explain
49. Explain cascadeless schedules.
50. Explain strict schedules.
51. What is serial schedules?
52. What is non serial schedule?
53. What is binary lock? Explain
54. Explain shared and exclusive locks.
55. Explain basic 2 Two-phase locking.
56. Explain conservative two-phase locking.
57. Explain strict two-phase locking.
58. Explain Rigorous two phase locking.
59. What is deadlock?
60. What is starvation?
61. What is recovery?
62. Explain deferred Update? Why it is called NO-UNDO/REDO algorithm.?
63. Explain immediate Update? Why it is called UNDO/NO-REDO algorithm.?
64. Explain Write ahead logging?
65. Explain steal and no steal approach of database updation.

66. Explain force and no force approach of database updation.
67. What is query optimization?
68. What are heuristic rules?
69. What is external sorting?
70. What is selectivity?
71. What is degree of homogeneity?
72. What is degree of autonomy?
73. What is multidatabase?
74. What is semantic heterogeneity?
75. What is horizontal fragmentation?
76. What is vertical fragmentation?
77. What is non-redundant allocation?
78. What is replication?
79. What is allocation?

Section-C

Long answer type questions

1. Explain a) Database b) DBMS c) Program & Data independence d) end user e)DBA f) Data model g) Database schema h) DDL i) External schema j) conceptual schema k) DML l) VDL
2. Explain: i) Logical data independence ii) Physical data independence
3. Describe the role of DBA in DBMS
4. What are the elements of a database?
5. Why do we need DBMS?
6. Discuss the different classifications of DBMS.
7. What is the difference between external and internal schema?
8. What are the characteristics of a data in a database?
9. With a neat diagram, explain Three-Schema-Architecture.
10. What is the difference between logical data independence and physical data independence? Which is easier to accomplish? Why?
11. How is traditional file processing different from database approach?
12. Explain the types of software components which constitute a DBMS and the types of computer system software with which DMBS interacts.
13. What are the responsibilities of the DBA and the database designers?
14. What do you mean by Database Management System? Explain the various advantages of using a Database management System
15. Who are the different types of database end users? Discuss the main activities of each of them.
16. Write the general architecture of typical DBMS. What are the effects of data independence in DBMS?
17. What are the different levels of abstraction of a DBMS? Briefly explain each of them.
18. What does defining, manipulating and sharing of a database mean ?
19. Discuss the techniques for allocating file blocks on disk.
20. Discuss the advantages and disadvantages of using (a) an unordered file, (b) an ordered file, and (c) a static hash file with buckets and chaining. Which operations can be performed efficiently on each of these organizations, and which operations are expensive?

21. Discuss the techniques for allowing a hash file to expand and shrink dynamically. What are the advantages and disadvantages of each?
22. What are the main goals of the RAID technology? How does it achieve them?
23. How does disk mirroring help improve reliability? Give a quantitative example.
24. What characterizes the levels in RAID organization?
25. What are the highlights of the popular RAID levels 0, 1, and 5?
26. What are storage area networks? What flexibility and advantages do they offer?
27. Explain problems related with insertion and deletion of records in fixed length format records
28. Explain problems related with insertion and deletion of records in variable length format records
29. Differentiate spanned and unspanned records.
30. Explain various types of operations that can be performed on the disk.
31. What is heap file organization? Explain problems related to insertion, deletion and updation of records in heap file organization.
32. What is sequential file organization? Explain problems related to insertion, deletion and updation of records in sequential file organization.
33. Explain various hashing techniques.
34. Explain various collision resolution techniques.
35. Explain extendible hashing with suitable example.
36. Explain linear hashing with suitable example.
37. How reliability can be improved with RAID?
38. What is RAID organization? Explain all RAID levels?
39. Explain B tree with suitable example?
40. Explain B+ tree with suitable example?
41. What is concurrency ? Why concurrency is needed?
42. Explain states of transaction?
43. What are various desirable properties of transaction?
44. How can we characterize schedules based on recoverability?
45. How can we characterize schedules based on serializability?
46. What is conflict serializability? Explain with suitable example.
47. What is view serializability? Explain with suitable examples.
48. How can we test conflict serializability? explain
49. How can we test view serializability? explain
50. How can we say two schedules are conflict equivalent?
51. How can we say two schedules are view equivalent?
52. What is two-phase locking (2PL)? Explain
53. What is a deadlock ? How can a deadlock occur ? explain.
54. Explain deadlock prevention methods.
55. Explain deadlock detection methods.
56. What is time stamp? Explain Timestamp ordering algorithms.
57. Explain strict Timestamp ordering.
58. Explain Thomas's write rule.
59. What is check point?
60. Explain Fuzzy check-pointing?
61. Explain recovery techniques based on differed update.
62. Explain recovery techniques based on immediate update.

63. Explain shadow paging with suitable example.
64. Explain ARIES recovery algorithm
80. Explain the purpose of checkpoint mechanism. How often should checkpoints be performed
81. Why is concurrency control needed? Explain lost update, Inconsistent retrievals and Uncommitted dependency anomalies.
82. What is two-phase locking and how does it guarantee serializability ?
83. Differentiate between Two phase locking and Rigorous two-phase locking.
84. How can deadlocks be avoided when using 2PL?
85. How precedence graph can be used to detect deadlock ?
86. Check whether the following schedules is conflict serializable or view serializable

T_1	T_2
read(A) $A := A - 50$	read(A) $temp := A * 0.1$ $A := A - temp$ write(A) read(B)
write(A) read(B) $B := B + 50$ write(B)	$B := B + temp$ write(B)

87. Explain sort merge algorithm for external sorting.
88. Explain algorithms for select and join operation.
89. How join selection factor affects join performance?
90. Explain algorithms for project and set operation.
91. What do you understand by distributed databases? Give the various advantages and disadvantages of distributed database management system.
92. What are the main reasons for and potential advantages of distributed databases?
93. What additional functions does a DDBMS have over a centralized DBMS?
94. Discuss what is meant by the following terms: *degree of homogeneity of a DDBMS*, *degree of local autonomy of a DDBMS*, *federated DBMS*, *distribution transparency*, *fragmentation transparency*, *replication transparency*, *multidatabase system*.
95. Discuss the architecture of a DDBMS. Within the context of a centralized DBMS, briefly explain new components introduced by the distribution of data.
96. What are the main software modules of a DDBMS? Discuss the main functions of each of these modules in the context of the client-server architecture.
97. Compare the two-tier and three-tier client-server architectures.
98. What is a fragment of a relation? What are the main types of fragments? Why is fragmentation a useful concept in distributed database design?
99. Why is data replication useful in DDBMSs? What typical units of data are replicated?
100. What is meant by *data allocation* in distributed database design? What typical units of data are distributed over sites?
101. How is a horizontal partitioning of a relation specified? How can a relation be put back together from a complete horizontal partitioning?

102. How is a vertical partitioning of a relation specified? How can a relation be put back together from a complete vertical partitioning?
103. What are various issues related with federated DBMS?
104. What is transparency? Explain various type of transparencies associated distributed database?
105. What are advantages of using distributed database?

M.Sc. Computer Science Semester - II

Subject - Soft Computing

Section-A

Multiple choice/Very short type questions

- Which of the following is not a soft computing tool.
 - Fuzzy logic
 - Artificial Neural Network
 - 'Genetic algorithm
 - Artificial Intelligence
- Which of the following is a non linear separable problem
 - Logical AND
 - Logical OR
 - Logical AND-NOT
 - Logical XOR
- In which of the following neural network problem of network paralysis occurs
 - Back propagation network
 - Kohonen network
 - Hopefield network
 - None of the above
- Which of the network follow winner takes all strategy
 - Back propagation network
 - Kohonen network
 - Hopefield network
 - None of the above
- Which of the following is called memory network
 - Bidirectional Associative Memory.
 - Auto Associative Memory.
 - Both a and b
 - None of the above
- A perceptron is:
 - a single layer feed-forward neural network with pre-processing
 - an auto-associative neural network
 - a double layer auto-associative neural network
 - a neural network that contains feedback
- An auto-associative network is:
 - a neural network that contains no loops
 - a neural network that contains feedback
 - a neural network that has only one loop
 - a single layer feed-forward neural network with pre-processing
- A 4-input neuron has weights 1, 2, 3 and 4. The transfer function is linear with the constant of proportionality being equal to 2. The inputs are 4, 10, 5 and 20 respectively. The output will be:
 - 238
 - 76
 - 119
 - 123
- Which of the following is true?

- (i) On average, neural networks have higher computational rates than conventional computers.
 - (ii) Neural networks learn by example.
 - (iii) Neural networks mimic the way the human brain works.
 - a) All of the mentioned are true
 - b) (ii) and (iii) are true
 - c) (i), (ii) and (iii) are true
 - d) None of the mentioned
10. Which of the following is true for neural networks?
- (i) The training time depends on the size of the network.
 - (ii) Neural networks can be simulated on a conventional computer.
 - (iii) Artificial neurons are identical in operation to biological ones.
 - a) All of the above
 - b) Only ii
 - c) I and ii
 - d) None of the above
11. What are the advantages of neural networks over conventional computers?
- (i) They have the ability to learn by example
 - (ii) They are more fault tolerant
 - (iii) They are more suited for real time operation due to their high 'computational' rates
 - a) (i) and (ii) are true
 - b) (i) and (iii) are true
 - c) Only (i)
 - d) All of the above
12. Which of the following is true?
Single layer associative neural networks do not have the ability to:
- (i) perform pattern recognition
 - (ii) find the parity of a picture
 - (iii) determine whether two or more shapes in a picture are connected or not
 - a) (ii) and (iii) are true
 - b) (ii) is true
 - c) All of the mentioned
 - d) None of the mentioned
13. Which is true for neural networks?
- a) It has set of nodes and connections
 - b) Each node computes it's weighted input
 - c) Node could be in excited state or non-excited state
 - d) All of the mentioned
14. Why is the XOR problem exceptionally interesting to neural network researchers?
- a) Because it can be expressed in a way that allows you to use a neural network
 - b) Because it is complex binary operation that cannot be solved using neural networks
 - c) Because it can be solved by a single layer perceptron
 - d) Because it is the simplest linearly inseparable problem that exists.
15. What is back propagation?
- a) It is another name given to the curvy function in the perceptron
 - b) It is the transmission of error back through the network to adjust the inputs
 - c) It is the transmission of error back through the network to allow weights to be adjusted so that the network can learn.

- d) None of the mentioned
16. Why are linearly separable problems of interest of neural network researchers?
- a) Because they are the only class of problem that network can solve successfully
 - b) Because they are the only class of problem that Perceptron can solve successfully
 - c) Because they are the only mathematical functions that are continue
 - d) Because they are the only mathematical functions you can draw
17. Having multiple perceptrons can actually solve the XOR problem satisfactorily: this is because each perceptron can partition off a linear part of the space itself, and they can then combine their results.
- a) True – this works always, and these multiple perceptrons learn to classify even complex problems.
 - b) False – perceptrons are mathematically incapable of solving linearly inseparable functions, no matter what you do
 - c) True – perceptrons can do this but are unable to learn to do it – they have to be explicitly hand-coded
 - d) False – just having a single perceptron is enough
18. The network that involves backward links from output to the input and hidden layers is called as ____.
- a) Self organizing maps
 - b) Perceptrons
 - c) Recurrent neural network
 - d) Multi layered perceptron
19. Which of the following is an application of NN (Neural Network)?
- a) Sales forecasting
 - b) Data validation
 - c) Risk management
 - d) All of the mentioned
20. Which of the following is a competitive network
- a) Back propogation network
 - b) Kohonen Network
 - c) Perceptron network
 - d) None of the above
21. Fuzzy logic is a form of
- a) Two-valued logic
 - b) Crisp set logic
 - c) Many-valued logic
 - d) Binary set logic
22. Traditional set theory is also known as Crisp Set theory.
- a) True
 - b) False
23. fuzzy logic is extension of crisp set with an extension of handling the concept of partial truth.
- a) True
 - b) False
24. The values of the set membership is represented by
- a) Discrete set
 - b) Degree of truth
 - c) Probabilities
 - d) Both b and c

25. Fuzzy Set theory defines fuzzy operators. Choose the fuzzy operators from the following.
- AND
 - OR
 - EX-OR
 - Both a and b
26. Fuzzy logic is usually represented as
- IF-Then-Else rule
 - If-Then rule
 - Both a and b
 - None of the above
27. Which of the following is found in Genetic algorithm
- Evolution
 - Selection
 - Reproduction
 - Mutation
- I and ii
 - I,ii and iii
 - Ii,iii and iv only
 - All of the above
28. Where are genetic algorithm applicable
- Real time application
 - Biology
 - Artificial life
 - Economics
- I,ii and iii
 - Ii,iii and iv
 - I,iii and iv
 - All the above
29. Which of the following is an operator of genetic algorithm.
- Selection
 - Crossover
 - Mutation
 - All the above
30. Which of the following is crossover technique
- Single point cross over
 - Multi point crossover
 - Both a and b
 - None of the above

Answer:- 1.d 2.d 3.a 4.b 5.c 6.a 7.b 8.a 9.a 10.c 11.d 12.a 13d 14.d 15.c 16.b
 17. 18.c 19.d 20.b 21.c 22.a 23.a 24.d 25.d 26.b 27.d 28.b 29.d 30.

Section-B

Short answer type questions

- Draw an architecture of simple artificial neural network and discuss .
- What do you understand by learning of artificial neural network.

3. If input vector is $[1\ 0\ 1\ 0]$ then calculate weight matrix in case of auto associative memory.
4. Explain limitations of single layer neural network.
5. What are the properties of fuzzy relation.
6. Discuss about fuzzy operations which are not applicable in crisp set.
7. Explain core, support, boundary in context of fuzzy logic.
8. What is gene and chromosomes in genetic algorithm?
9. Why mutation operator in genetic algorithm is used.
10. Define the term bias and threshold in context of neural network.
11. Compare feed forward with feedback neural network.
12. What is associative memory?
13. What is winner takes all strategy ? Where it is used.?
14. Explain how excluded middle law and law of contradiction does not get satisfied in fuzzy logic.
15. What is linguistic variable in fuzzy logic .Consider any real world problem and identify linguistic variables.
16. Identify two problem domain in engineering/ science where genetic algorithm can be used.
17. What is the role of fitness function in genetic algorithm .
18. What are the different crossover techniques.
19. List the main components of biological neuron .
20. What do you understand by learning rate and momentum in artificial neural network.
21. Which neural network model is basically used to perform basic logic operations like AND and OR?
22. What are the draw backs of Error Back Propagation Network (EBPN).
23. Find out Cartesian product set of two sets $X=\{x_1,x_2,x_3\}$ and $Y=\{y_1,y_2,y_3\}$
24. What do you understand by Universe of discourse in fuzzy set.
25. Write about crossover probability and mutation probability in case of Genetic Algorithm.
26. What do you understand by Encoding of a chromosome.?
27. What is the necessity of composition of a fuzzy relation.
28. The elements of two sets X and Y are given as $X= \{1,2,3\}$ and $Y = \{a, b, c\}$.Find the Cartesian products $X \times Y$ and $Y \times X$.
29. Define fuzzification and defuzzification process.
30. What are different types of learning.
31. What are different activation functions.
32. Differentiate Classical set with fuzzy set.
33. What do you understand by membership function in fuzzy logic.
34. What are the different parts of a membership function.
35. What is fuzzy measures?
36. What is the role of objective function in genetic algorithm.
37. Explain basic philosophy of genetic algorithm.
38. Define the term soft computing.
39. What are the various application areas of soft computing.
40. How multi layer ANN can solve complex problem.
41. What are threshold and weight.
42. Draw a simple diagram of single layer Neural network and explain its various parts.

43. When bias in neural network is used?
44. What do you mean by optimization.?
45. Compare and contrast traditional algorithm and genetic algorithm.
46. Why one can think about hybrid soft computing based model.
47. Write name of any two generic soft computing models.
48. Associate the characteristics of Biological Neural Network with Artificial Neural Network.
49. Write equation of any four activation functions.
50. Define bidirectional associative memory (BAM) and its type .
51. State Charles Darwin theory of natural evolution.
52. What is search space in Genetic algorithm.
53. What is encoding in Genetic Algorithm?
54. What do you understand by learning of artificial neural network.
55. Explain limitations of single layer neural network.
56. What are the properties of fuzzy relation.
57. Genetic Algorithm is searching and optimization technique- Explain.
58. Why mutation operator in genetic algorithm is used.
59. What is linguistic variable in fuzzy logic .Consider any real world problem and identify linguistic variables.
60. What are the different crossover techniques.
61. Which neural network model is basically used to perform basic logic operations like AND and OR?
62. What is the necessity of composition of a fuzzy relation.
63. What is fuzzy measures?
64. What is over fitting or over training .
65. A four input neuron has weights 1,2,3 and 4.The transfer function is linear with the constant of proportionality being equal to 2 .The inputs are 0,5,10 and 20 .What is the net output ?.
66. What are the various types of composition techniques of fuzzy relation.
67. Define normal fuzzy set and convex fuzzy set .
68. How genetic algorithm is different from conventional optimization technique.
69. What are the three basic operators of genetic algorithm.
70. What do you understand by population size and offspring.
71. What do you understand by reinforcement learning of ANN?
72. What is the role of weight in ANN.
73. What is content address memory (CAM).
74. Define Euclidean distance.
75. Compare and contrast classical logic with fuzzy logic.
76. Explain properties of fuzzy relation.
77. Write the name of any two defuzzification methods.
78. Compare traditional algorithm with Genetic algorithm.
79. What are the effect of basic genetic operators.
80. Write and explain two problem domains where Genetic Algorithm used.

Section-C

Long answer type questions

1. What are the various soft computing tools? Differentiate among these tools.
2. Explain area of application of soft computing
3. Differentiate different soft computing tools in terms of their characteristics.
4. Differentiate soft computing with hard computing.
5. Differentiate soft computing with Artificial Intelligence (AI).
6. Explain McCulloch-Pitts neuron .
7. Implement ANDNOT function using McCulloch-Pitts neuron with binary data.
8. Consider input vector $[0.3 \ 0.4 \ 0.5 \ 0.6]$ and weight vectors $w_1=[1,0.3,0.4,0.7,0.8]$ and $w_2=[0.2,0.4,0.5,0.6,1]$ with learning rate $=0.3$. Train kohonen network for two iterations .
9. Write training and testing algorithm of error back propagation algorithm (EBPA) .Also discuss drawbacks of EBPA.
10. Discuss characteristics and architecture of multi layer neural network.
11. Discuss auto associative discrete hopefield network with input pattern $[1 \ 1 \ 1 \ -1]$ using weight matrix with no self connection .Test the network with missing entries.
12. Construct a kohonen self organizing map to cluster the four given vectors $[0 \ 0 \ 11][1 \ 0 \ 0], [0 \ 1 \ 1 \ 0]$ and $[0 \ 0 \ 0 \ 1]$.The number of clusters to be formed is two and weights are $w_1=[0.2 \ 0.4 \ 0.6 \ 0.8]$ and $w_2 = [0.9 \ 0.7 \ 0.5 \ 0.3]$.Assume an initial learning rate 0.5.
13. Explain weight updation process after introducing momentum term in case of Error Back Propogation neural network .Derive generalize formulae for weight updation.
14. Explain hebbian network in terms of following (a) Theory (b) Training algorithm (c) Flow chart
15. Discuss kohonen self organizing feature maps in terms of following (a) Architecture (b) Training algorithm
16. Explain architecture of Adaptive neuro fuzzy inference system (ANFIS) with its benefits and drawbacks.
17. Consider input vector $[0.3 \ 0.4 \ 0.5 \ 0.6]$, weight vectors $w_1=[1,0.3,0.4,0.7,0.8]$ and $w_2=[0.2,0.4,0.5,0.6,1]$ with learning rate $=0.3$.Train kohonen network for two iterations .
18. Write Error back propagation algorithm with flow chart.
19. Draw an architecture of single layer neural network and find out suitable weight vector to solve logical OR problem with threshold activation function with threshold value 0.45.
20. What are the strengths and drawbacks of Error back propogation algorithm.?
21. What do understand by associative memory network.? What are its type.?
22. Explain how logical XOR problem is non linearly separable problem.
23. What do you understand by competitive learning.
24. Explain linearly separable and linearly non separable problem with suitable example.
25. Discuss training algorithm of discrete hopefield network.
26. What is the role of energy function in discrete hopefield network. Proof mathematically.
27. Prove that the derivation of hyperbolic tangent function $f(x)$ is $[1+f(x)] * [1-f(x)]$.
28. Design a hebbian network (Hebb Net) to implement logical OR function. Train the network with bipolar input and target.
29. Explain McCulloch-Pitts neuron .

30. What do you understand by linear separability. Explain with suitable example.
31. Write training and testing algorithm of error back propagation algorithm(EBPA) .Also discuss drawbacks of EBPA.
32. (a) Implement ANDNOT function using McCulloch Pits Neuron with binary input and output.
(b) Discuss characteristics and architecture of multi layer neural network.
33. Discuss auto associative discrete Hopfield network with input pattern [1 1 1 -1] using weight matrix with no self connection .Test the network with missing entries.
34. Construct a Kohonen self organizing map to cluster the four given vectors[0 0 11][1 0 0 0],[0 1 1 0] and [0 0 0 1].The number of clusters to be formed is two and weights are $w_1=[0.2 \ 0.4 \ 0.6 \ 0.8]$ and $w_2=[0.9 \ 0.7 \ 0.5 \ 0.3]$.Assume an initial learning rate 0.5.
35. Discuss Kohonen self organizing feature maps in terms of following
(b) Architecture (b) Training algorithm
36. What are the different types of associative memories? Discuss its characteristics and draw architecture of each.
37. How can the equation of the straight line be formed using linear separability.?
38. Find the weights using perceptron learning for ANDNOT function for two epochs with binary inputs and targets.
39. What are the characteristics of multi layer neural network (MLNN) ? Explain with suitable example.
40. Train a hetero associative memory network using Hebb network to store input row vector (S1,S2,S3,S4) to the output row vector (T1,T2) as given below-

Input & target	S1	S2	S3	S4	T1	T2
Sample-1	1	0	1	0	1	0
Sample-2	1	0	0	1	1	0
Sample-3	1	1	0	0	0	1
Sample-4	0	0	1	1	0	1

Also test the performance of a network using its training input as testing input.

41. Consider the following two fuzzy sets in Zadeh form

$$X = \left\{ \frac{1}{2} + \frac{0.3}{4} + \frac{0.5}{6} + \frac{0.2}{8} \right\} \text{ and } Y = \left\{ \frac{0.5}{2} + \frac{0.4}{4} + \frac{0.1}{6} + \frac{1}{8} \right\}$$

Check for the following properties of fuzzy logic based on above two fuzzy sets.

- (a) Commutative (b) De Morgan's law
42. Discuss fuzzy relation in terms of following
(a) Definition (b) Composition of fuzzy relation (c) Operation
43. Consider following fuzzy set

$A = \left\{ \frac{0.9}{2} + \frac{0.3}{4} + \frac{0.5}{6} + \frac{0.2}{8} \right\}$ perform normalization, Dilation and concentration operations over this set.

44. Explain various operations and properties of fuzzy set.
45. Consider following two fuzzy sets in Zadeh Notation
 $A = 0.5/x_1 + 0.7/x_2 + 0.6/x_3 + 0.9/x_4 + 1/x_5$
 $B = 0.2/x_1 + 0.4/x_2 + 0.5/x_3 + 0.45/x_4 + 0/x_5$
 Find out following:
 i. Compliment of fuzzy set A and B.
 ii. Union of above two fuzzy sets.
 iii. Intersection of above two fuzzy sets
46. Explain basic operations of fuzzy set with proper diagram of membership function. Also explain properties of fuzzy sets.
47. Explain two fuzzy composition operations of two fuzzy relations (Take your own fuzzy relation sets).
48. Write short notes on Fuzzy relation with suitable numerical example.
49. Consider two fuzzy sets as given below
 $A = \left\{ \frac{0.2}{train} + \frac{0.5}{bike} + \frac{0.3}{boat} \right\}$, $B = \left\{ \frac{1}{train} + \frac{0.2}{bike} + \frac{0.4}{boat} \right\}$
 Perform following
 (a) A union B and its compliment
 (b) A intersection B its compliment
 (c) Proof de morgean's law
50. What do you understand by fuzzification and defuzzification.? Explain any three defuzzification methods with along with algebraic expression.
51. Consider a real world problem to develop a fuzzy inference system (FIS) with following:
 (a) Two input and one output variables (b) Three linguistic variables of each input and output variable (c) Suitable set of Rule base.
52. What are various defuzzification operations.? Explain in detail.
 Consider the following two fuzzy sets in zadeh form
 $A = \left\{ \frac{0.2}{1} + \frac{0.3}{3} + \frac{0.5}{4} + \frac{0.4}{5} + \frac{0.6}{6} \right\}$ and $B = \left\{ \frac{0.5}{1} + \frac{0.4}{3} + \frac{0.3}{4} + \frac{0.2}{5} + \frac{0.1}{6} \right\}$
 Perform the following operations over the above two fuzzy sets
 $A \cup B$ (b) $A \cap B$ (c) Compliment of $A \cap B$ (d) Compliment of $A \cup B$
53. Explain following fuzzy operations with suitable example and mathematical formulae:
 (a) Normalization (b) Dilation (c) Concentration
54. Consider two fuzzy sets as given below
 $A = \left\{ \frac{0.2}{LS} + \frac{0.5}{MS} + \frac{0.7}{HS} \right\}$, $B = \left\{ \frac{0.1}{PS} + \frac{0.55}{ZE} + \frac{0.85}{NE} \right\}$
 Perform following
 (a) Find out fuzzy relation $R = A \times B$
 (b) Introducing Fuzzy set $C = \left\{ \frac{0.25}{LS} + \frac{0.5}{MS} + \frac{0.75}{HS} \right\}$
 Find out Max –Min composition in between C and R

c) Find out Max –Product composition in between C and R

55. Consider following fuzzy set

$A = \left\{ \frac{0.9}{2} + \frac{0.3}{4} + \frac{0.5}{6} + \frac{0.2}{8} \right\}$ perform normalization, Dilation and concentration operations over this set.

56. Explain basic operations of fuzzy set with proper diagram of membership function. Also explain properties of fuzzy sets.

57. Consider three fuzzy sets as given below

$A = \left\{ \frac{0.1}{Low} + \frac{0.2}{Medium} + \frac{0.7}{High} \right\}$, $B = \left\{ \frac{0.9}{Positive} + \frac{0.4}{Zero} + \frac{0.9}{Negative} \right\}$ and $C = \left\{ \frac{0.3}{Low} + \frac{0.4}{Medium} + \frac{0.6}{High} \right\}$

Perform following

(a) Find out fuzzy relation $R = A \times B$

(b) Find out Fuzzy relation $S = B \times C$

(c) Find out Max –Min composition in between C and R.

58. How fuzzy measure is different from fuzzy logic? Find association among various fuzzy measures.

59. Why encoding of chromosomes are required?

60. Explain various encoding methods of genetic algorithm.

61. Explain biological background of genetic algorithm.

62. What are the various selection techniques used in genetic algorithm?

63. Explain applicability of genetic algorithm for searching and optimization also explain following in context of genetic algorithm (a) Chromosome (b) gene (c) Population. (d) Offspring

64. Briefly explain advantages and disadvantages of genetic algorithm.

65. Write algorithm of basic genetic algorithm.

66. Write short notes on application of genetic algorithm.

67. Write Pseudo code of Basic GA and draw its flow chart. Also explain purpose of three GA operators.

68. Explain following in context of Genetic algorithm

(a) Gene (b) chromosome (c) Population

69. What is the role of crossover probability and mutation probability in Genetic algorithm.

70. How crossover is performed? Explain various crossover techniques of genetic algorithm.

71. Why encoding of chromosomes are required? Explain various encoding methods of genetic algorithm.

72. Explain applicability of genetic algorithm for searching and optimization also explain following in context of genetic algorithm (a) Chromosome (b) gene (c) Population. (d) Offspring

73. Write short notes on application of genetic algorithm.

74. How genetic algorithm can be used to solve maximization and minimization problem? Explain with suitable example.

75. How a function can be optimized using genetic algorithm? Explain with suitable example.

