Youth Competition Times

NTA/UGC-NET-JRF/SET

COMPUTER SCIENCE & APPLICATIONS

Solved Papers

(Also Useful for Other State Level Competitive Examinations)

Chief Editor
Anand K. Mahajan

Compiled and Edited by
YCT Expert Team

Computer Graphics by
Balkrishna, Charan Singh

Editorial Office
12, Church Lane Prayagraj-211002
9415650134
Email : yctap12@gmail.com
website : www.yctbooks.com/www.yctfastbook.com/www.yctbooksprime.com

Publisher Declaration
Edited and Published by A.K. Mahajan for YCT Publications Pvt. Ltd.
and printed by Roop Printing Press, Prayagraj. In order to Publish the book,
full care has been taken by the Editor and the Publisher,
still your suggestions and queries are welcomed.
In the event of any dispute, the judicial area will be Prayagraj.

Rs. : 995/-

CONTENT

University Grant Commission (UGC) NET : Computer Science & Applications

NTA/UGC-NET Syllabus

New Pattern

As per the revised scheme, the test will consist of two papers as below:

Paper	Marks	Number of Questions	Duration
I	100	50 questions. All are compulsory	1 Hour (09:30 AM to 10:30 AM) IST
II	200	100 questions. All are compulsory	2 Hour (11:00 AM to 1:00 PM) IST

Paper-I Shall consist of 50 objective type compulsory questions each carrying 2 marks. The questions which will be of general nature, intended to assess the teaching/research aptitude of the candidate. It will primarily be designed to test reasoning ability, comprehension, divergent thinking and general awareness of the candidate.

Paper-II Shall consist of 100 objective type compulsory questions each carrying 2 marks which will be based on the subject selected by the candidate.

All the questions of Paper – II will be compulsory, covering entire syllabi of earlier Paper II & Paper III (including all electives, without options).

SYLLABUS FOR PAPER-II

1. Discrete Structures : Sets, Relations, Functions, Pigeonhole Principle, Inclusion-Exclusion Principle, Equivalence and Partial Orderings. Elementary Counting Techniques. Probability. Measure(s) for information and Mutual information. *Computability*. Models of computation – Finite Automata, Pushdown Automata, Non-determinism and NFA, DPDA and PDAs and Languages accepted by these structures. Grammars, Languages, Non-computability and examples of non-computable problems.

Graph. Definition, walks, paths, trails, connected graphs, regular and bipartite graphs, cycles and circuits, tree and rooted tree. Spanning trees. Central Graphs. Centre(s) of a tree. Hamiltonian and Eulerian graphs, Planar graphs.

Groups. Finite fields and Error correcting/detecting codes.

2. Computer Arithmetic : Propositional (Boolean) Logic, Predicate Logic, Well-formed-formulae (WFF), Satisflability and Tautology.

Logic Families. TCL, ECL and C-MOS gates. Boolean algebra and Minimization of Boolean functions, Flip-flops-types, race condition and comparison. Design of combinational and sequential circuits.

Representation of Integers. Octal, Hex, Decimal and Binary. 2′s complement and I′s complement arithmetic. Floating point representation.

3. Programming in C and C++ : *Programming in C.* Element of C– Tokens, identifiers, data types in C. Control structures in C. Sequence, selection and iteration (s). Structured data types in C–arrays, struct, union, string and pointers.

O-O Programming Concepts. Class, object, instantiation. Inheritance polymorphism and overloading.

C++ *Programming*. Elements of C++ – Takens, identifiers. Variables and constants, Data types, Operators, Control statements. Functions parameter passing. Class and objects. Constructors and destructors. Overloading, inheritance, templates, exception handling.

4. Relational Database Design and SQL : E-R diagrams and their transformation to relational design, normalisation – 1 NF, 2NF, 3NF, BCNF and 4NF. Limitations of 4NF and BCNF.

SQL. Data Definition Language (DDL), Data Manipulation Language (DML), Data Control Language (DCL) commands. Database objects like–views, indexes, sequences, synonyms, data dictionary.

5. Data and File Structures : Data, information, Definition of data structure. Arrays, stacks, queues, linked lists, trees, graphs, priority queues and heaps.

File Structures. Fields, records and files. Sequential, direct, index sequential and relative files. Hashing, inverted lists and multi-lists. B trees and B+ trees.

6. Computer Networks : *Network Fundamentals*. Local Area Networks (LAN), Metropolitan Area Networks (MAN), Wide Area Networks (WAN), Wireless Networks. Inter Networks.

Reference Models. The OSI model, TCP/IP model.

Data Communication. Channel capacity, Transmission media–twisted pair, coaxial cables, fibre-optic cables, wireless transmission-radio, microwave infrared and millimetre waves. Lightwave transmission. The Telephones – local loop, trunks, multi-plexing, switching, narrowband ISDN, broadband ISDN, ATM, High Speed LANS. Cellular Radio. Communication satellites–geosynchronous and low-orbit.

Internetworking. Switch/Hub, Bridge, Router, Gateways, Concatenated virtual circuits, Tunnelling, Fragmentation, Firewalls. Routing: Virtual circuits and datagrams. Routing algorithms. Conjestion control.

Network Secuity. Cryptography – public key, secret key. Domain Name System (DNS) – Electronic Mail and World Wide Web (WWW). The DNS, Resource Records, Name servers, E-mail-architecture and Servers.

7. System Software and Compilers : Assembly language fundamentals (8085 based assembly language programming). Assemblers-2-pass and single-pass. Macros and macroprocessors.

Loading, linking, relocation, program relocatability. Linkage editing. Text editors, Programming Environments, Debuggers and program generators.

Compilation and Interpretation. Bootstrap compiler. Phases of compilation process. Lexical analysis. Lex package on Unix system.

Context free grammars. Parsing and parse trees. Representation of parse (derivation) trees as rightmost and leftmost derivations. Bottom up parsers–Shift–reduce, operator precedence and LR. YACC package on Unix system.

8. Operating Systems (with Case Study of Unix) : Main functions of operating systems, Multiprogramming, multiprocessing and multitasking.

Memory Management. Virtual memory, paging, fragmentation.

Concurrent Processing. Mutual exclusion, Critical regions, lock and unlock.

Scheduling. CPU scheduling, IO scheduling, Resource scheduling, Deadlock and scheduling algorithms. Banker's algorithm for deadlock handling.

UNIX. The Unix System File system process management, bourne shell, shell variables, command line programming.

Filters and Commands. Pr, head, tail, cut, paste, srt, uniq, tr. join, etc., grep, egrep, fgrep, etc., sed, awk, etc.

System Calls (like). Create, open, close, read, write, iseek, link, unlink, fstat. umask, chmod, exec, fork, wait, system.

9. Software Engineering : System Development Life Cycle (SDLC). Steps, water fall model, Prototypes, Spiral model.

Software Metrics. Software Project Management.

Software Design. System design, detailed design, function oriented design, object oriented design, user interface design. Design level metrics.

Coding and Testing. Testing level metrics. Software quality and reliability. Clean room approach, software re-engineering.

10. Current Trends and Technologies : The topics of current interest in Computer Science and Computer Applications shall be covered. The experts shall use their judgement from time to time include the topics of popular interest, which are expected to be known for an application development software professional, currently, they include:

***Parallel Computing* :** Parallel virtual machine (pvm) and message passing interface (mpi) libraries and calls. Advanced architectures. Today's fastest computers.

***Mobile Computing* :** Mobile connectivity - Cells, Framework, wireless delivery technology and switching methods, mobile information access devices, mobile data internetworking standards, cellular data communication protocols, mobile computing applications. Mobile databases – protocols, scope, tools and technology. M-business.

E-Technologies : *Electronic Commerce*. Framework, Media Convergence of Applications, Consumer Applications, Organisation Applications. *Electronic Payment Systems*. Digital Token, Smart Cards, Credit Cards, Risks in Electronic Payment System, Designing Electronic Payment Systems.

Electronic Data Interchange (EDI). Concepts, Applications, (Legal, Security and Privacy) issues, EDI and Electronic Commerce, Standardisation and EDI, EDI Software Implementation, EDI Envelope for Message Transport, Internet-Based EDI.

Digital Libraries and Data Warehousing. Concepts, Types of Digital documents, Issues behind document. Infrastructure, Corporate Data Warehouses.

Software Agents. Characteristics and Properties of Agents, Technology behind Software Agents (Applets, Browsers and Software Agents).

Broadband Telecommunications. Concepts, Frame Relay, Cell Relay, Switched Multi-megabit Data Service, Asynchronous Transfer Mode.

Main concepts in Geographical Information System (GIS), E-cash, E-Business, ERP packages.

Data Warehousing. Data Warehouse environment architecture of a data warehouse methodology, analysis, design, construction and administration.

Data Mining. Extracting models and patterns from large database, data mining techniques, classification, regression, clustering, summarisation, dependency modelling, link analysis, sequencing analysis, mining scientific and business data.

***Windows Programming*.** Introduction to Windows programming - Win 32, Microsoft Foundation Classes (MFC), Documents and views, Resources, Message handling in windows.

Simple Applications (in windows). Scrolling, splitting views, docking toolbars, status bars, common dialogs.

***Advanced Windows Programming*.** Multiple Document Interface (MDI), Multithreading, Object Linking and Embedding (OLE). Active X controls, Active Template Library (ATL). Network programming.

PAPER-III

(CORE Group)

Unit-I : Combinational Circuit Design, Sequential Circuit Design, Hardwired and Micro-programmed processor design, Instruction formats. Addressing modes, Memory types and organisation, Interfacing peripheral devices, Interrupts.

Microprocessor architecture, Instruction set and Programming (8085, P-III/P-IV), Micro-processor applications.

Unit-II : Database Concepts, ER diagram, Data Models, Design of Relational Database, Normalisation, SQL and QBE, Query Processing and Optimisation, Centralised and Distributed Database, Security, Concurrency and Recovery in Centralised and Distributed Database Systems, Object Oriented Database Management Systems (Concepts, Composite objects, Integration with RDBMS applications), ORACLE.

Unit-III : Display systems, Input devices, 2D Geometry, Graphic operations, 3D Graphics, Animation, Graphic standard, Applications. Concepts, Storage Devices, Input Tools, Authoring Tools, Application, Files.

Unit-IV : Programming language concepts, paradigms and models. Data, Data types, Operators, Expressions, Assignment. Flow of control–control structures, I/O statements, User-defined and built-in functions, Parameter passing.

Principles, classes, inheritance, class hierarchies, polymorphism, dynamic binding, reference semantics and their implementation. Principles, functions, lists, types and polymorphisms, higher order functions, lazy evaluation, equations and pattern matching. Principles, horn clauses and their execution, logical variables, relations, data structures, controlling the search order, program development in prolog, implementation of prolog, example programs in prolog.

Principles of parallelism, coroutines, communication and execution. Parallel Virtual Machine (PVM) and Message Passing Interface (MPI) routines and calls. Parallel programs in PVM paradigm as well as MPI paradigm for simple problems like matrix multiplication.

Preconditions, post-conditions, axiomatic approach for semantics, correctness, denotational semantics.

Compiler structure, compiler construction tools, compilation phases. Finite Automata, Pushdown Automata. Non-determinism and NPA, DPDA and PDAs and languages accepted by these structures. Grammars, languages-types of grammars-type 0, type 1, type 2 and type 3. The relationship between types of grammars and finite machines. Pushdown automata and Context Free Grammars, Lexical Analysis – regular expressions and regular languages. LEX package on Unix Conversion of NFA to DFA. Minimising the number of states in a DFA. Compilation and Interpretation. Bootstrap compilers.

Context free grammars. Parsing and parse trees. Representation of parse (derivation) trees as rightmost and leftmost derivations. Bottom up parsers - shift-reduce, operator precedence and LR. YACC package on Unix system. Topdown parses-left recursion and its removal .Recursive descent parser. Predictive parser, Intermediate codes – Quadruples, triples, intermediate code generation, code generation, code optimization.

Unit-V : Analog and Digital transmission, Asynchronous and Synchronous transmission, Transmission media, Multiplexing and Concentration, Switching techniques, Polling.

Topologies, Networking Devices, OSI Reference Model, Protocols for - (i) Data link layer, (ii) Network layer and (iii) Transport layer, TCP/IP protocols, Networks security. Network administration.

Unit-VI : Definition, Simple and Composite structures, Arrays, Lists, Stacks queues, Priority queues, Binary trees, B-trees, Graphs.

Sorting and searching Algorithms, Analysis of Algorithms, Interpolation and Binary Search, Asymptotic notations – big ohm; omega and theta. Average case analysis of simple programs like finding of a maximum of n elements. Recursion and its systematic removal. Quicksort–non-recursive imple-mentation with minimal stack storage. Design of Algorithms (Divide and Conquer, Greedy method, Dynamic programming, Back tracking, Branch and Bound). Lower bound theory, Non-deterministic algorithm-Non-deterministic programming constructs. Simple non-deterministic programs. NP-hard and NP-complete problems.

Unit-VII : Object, messages, classes, encapsulation, inheritance, polymorphism, aggregation, abstract classes, generalization as extension and restriction. Object oriented design. Multiple inheritance, metadata.

HTML, DHTML, XML, Scripting, Java, Servelets, Applets.

Unit-VIII : Software development models, Requirement analysis and specifications, Software design, Programming techniques and tools, Software validation and quality assurance techniques, Software maintenance and advanced concepts, Software management.

Unit-IX : Introduction, Memory management, Support for concurrent process, Scheduling, System deadlock, Multiprogramming system, I/O management, distributed operating systems, Study of Unix and Windows NT.

Unit-X : Definitions, Al approach for solving problems. Automated Reasoning with propositional logic and predicate logic-fundamental proof procedure, refutation, resolution, refinements to resolution (ordering/pruning/restriction strategies).

State space representation of problems, bounding functions, breadth first, depth first, A, A & AO*, etc. performance comparison of various search techniques.

Frames, scripts, semantic nets, production systems, procedural representations. Prolog programming.

Components of an expert system, knowledge representation and Acquisition techniques, Building expert system and Shell.

RTNs, ATNs, Parsing of Ambiguous CFGs. Tree Adjoining Grammars (TAGs). Systems approach to planning, Designing, Development. Implementation and Evaluation of MIS.

Decision-making processes, evaluation DSS, group decision support System and case studies, Adaptive design approach to DSS development, Cognitive style in DSS, Integrating expert and decision support systems.

PAPER-III (Electives)

Elective-I : *Theory of Computation*. Formal language, Need for formal computational models, Non-computational problems, diagonal argument and Russel's paradox.

Deterministic Finite Automation (DFA), Non-deterministic Finite Automation (NFA), Regular languages and regular sets, Equivalence of DFA and NFA. Minimising the number of states of a DFA. Non-regular languages and Pumping lemma.

Pushdown Automation (PDA), Deterministic Pushdown Automation (DPDA), Non-equivalence of PDA and DPDA.

Context free Grammars. Grelbach Normal Form (GNF) and Chomsky Normal Form (GNF), Ambiguity, Parse Tree Representation to Derivations. Equivalence of PDA's and CFG's. Parsing techniques for parsing of general CFG's – Early's, Cook-Kassami-Younger (CKY) and Tomita's parsing.

Linear Bounded Automata (LBA). Power of LBA. Closure properties.

Turing Machine (TM). One type, multitape. The notions of time and space complexity in terms of TM. Construction of TM of simple problems. Computational complexity.

Chomsky Hierarchy of Languages. Recursive and recursively-enumerable languages.

Elective-II : Models for Information Channel: Discrete Memoryless Channel, Binary Symmetric Channel (BSC), Burst Channel, Bit-error rates, Probability, Entropy and Shannon's measure of information. Mutual information. Channel capacity theorem. Rate and optimality of Information transmission.

Variable length Codes: Prefix Codes. Huffmann Codes, Lempel Ziew (LZ) Codes. Optimality of these codes, Information content of these codes.

Error Correcting and detecting Codes. Finite fields. Hamming distance, Bounds of codes, Linear (Parity Check) codes, Parity check matrix, Generatory matrix, Decoding of linear codes, Hamming codes. *Image Processing*. Image registration, Spatial Fourier Transforms, Discrete Spatial (20 dimensional) Fourier Transforms, Restoration, Lossy Compression of images (pictures).

Data Compression Techniques. Representation and compression of text, sound, picture and video files (based on the JPEG and MPEG standards).

Elective-III : Linear Programming Problem (LPP) in the standard form, LPP in Canonical form. Conversion of LPP in Standard form to LPP in Canonical form. Simplex – Prevention of cyclic computations in Simplex and Tableau, Big-M method, dual simplex and revised simplex.

Complexity of simplex algorithms.

Exponential behaviour of simplex.

Ellipsoid method and Karmakar's method for solving LPPs. Solving simple LPPs through these methods. Comparison of complexity of these methods.

Assignment and Transportation Problems. Simple algorithms like Hungarian method, etc.

Shortest Path Problems. Dijkstra's and Moore's method. Complexity.

Network Flow Problem. Formulation. Max-Flow Min-Cut theorem. Ford and fulkerson's algorithm. Exponential behaviour of Ford and Fulkerson's algorithm. Malhotra-Pramodkumar-Maheshwari (MPM) Polynomial algorithm for solving Network flow problem. Bipartite Graphs and Matchings: Solving matching problems using Network flow problems.

Matroids: Definition. Graphic and Co-graphic matroids. Matroid intersection problem.

Non-linear Programming. Kuhn-Tucker conditions. Convex functions and Convex regions. Convex programming problems. Algorithms for solving convex programming problems-Rate of convergence of iterative methods for solving these problems.

Elective-IV : Neural Networks. Perception model, Linear separability and XOR problem. Two and three layered neural nets, Back propagation-Convergence, Hopfield nets, Neural net learning. Applications.

Fuzzy Systems. Definition of a Fuzzy set, Fuzzy relations, Fuzzy set, Fuzzy relations, Fuzzy functions, Fuzzy measures, Fuzzy reasoning, Applications of Fuzzy systems.

Elective-V : Unix. Operating System, Structure of Unix Operating System, Unix commands, Interfacing with Unix, Editors and Compilers for Unix. LEX and YACC, File system, System calls, Filters, Shell programming.

Windows. Windows environment, Unicode, Documents and Views. Drawing in a windows, Message handling, Scrolling and Splitting views, Docking toolbars and Status bars, Common dialogs and Controls, MDI, Multithreading, OLE, Active X controls, ATL, Database access, Network programming.

U.G.C. NET Exam. June, 2012
COMPUTER SCIENCE
(Solved with Explanation Paper–II)

1. The postfix expression AB + CD–* can be evaluated using a

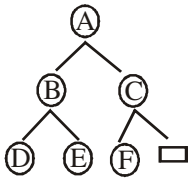
(a) Stack (b) Tree
(c) Queue (d) Linked list

Ans. (a) : Postfix expression can be evaluated using operand stack.

2. The post order traversal of a binary tree is DEBFCA. Find out the preorder traversal.

(a) ABFCDE (b) ADBFEC
(c) ABDECF (d) None of the above

Ans. (c) ABDECF – Because
By post order traversal, we cannot draw unique binary tree even with preorder and post order cannot define unique binary tree.



⇒ After considering this chart or binary tree, the entire traversal of the tree would be ABDECF. So the answer is option c.

Type	First	Second	Third
in order	L-Left	R_O-Root	R-Right
pre order	R_O-Root	L-Left	R-Right
post order	L-Left	R-Right	R_O-Root

3. The branch logic that provides making capabilities in the control unit is known as

(a) Controlled transfer
(b) Conditional transfer
(c) Unconditional transfer
(d) None of the above

Ans. (a) : Controlled transfer–that provider making capabilities in the control unit is unknown as control transfer.

4. The number of colours required to properly colour the vertices of every planer graph is

(a) 2 (b) 3
(c) 4 (d) 5

Ans. (a) : According to the 4-color theorem states that the vertices of every planar graph can be colored with at most 4 colors so that no two adjacent vertices receive the same color.

5. Networks that use different technologies can be connected by using

(a) Packets (b) Switches
(c) Bridges (d) Routers

Ans. (d): Routers–is a networking device that forwards data packets between computer networks. Router performs the traffic directing functions on the internet. A data packet is typically forwarded from one router to another through the networks that consitude their internetwork until it reaches its destination node. Router works at layer 3 of OSI model.

6. Both hosts and routers are TCP/IP protocol software. However, routers do not use protocol from all layers. The layer for which protocol software is not needed by a router is

(a) Layer–5 (Application)
(b) Layer–1 (Physical)
(c) Layer–3 (Internet)
(d) Layer–2 (Network Interface)

Ans. (a) : Layer–5 (Application)–Because Routing is a way to get one packet from one destination to the next. So (Application) layer–5 includes all the higher protocols. So the answer is Layer–5 (Application)

7. In multiuser database if two users wish to update the same record at the same time, they are prevented from doing so by

(a) Jamming (b) Password
(c) Documentation (d) Record lock

Ans. (d): Record lock– is the technique of preventing simultaneous access to data in a database, to prevent inconsistent results. If a collision is occure, both of the senders will send a jamming signal over the Ethernet.

8. A binary search tree is a binary tree

(a) All items in the left subtree are less than root
(b) All items in the right subtree are greater than or equal to the root
(c) Each subtree is itself a binary search tree
(d) All of the above

Ans. (d) : All of the above–The above mentioned properties are mentioned in book of Data Structures (DS). According to summary on binary search trees the following properties are

⇒ All items in the left subtree are less than root.
⇒ All items in the right subtree are greater than or equal to root.
⇒ Each subtree is itself a binary search tree (BST).

So the correct answer would be (d).

9. What deletes the entire file except the file structure?

(a) ERASE (b) DELETE

(c) ZAP (d) PACK

Ans. (C) : ZAP–Because ZAP Command removes all records from a table, leaving just a table structure. **ERASE** command deletes a file from disk.

10. Which command is the fastest among the following?

(a) COPY TO <NEW FILE>

(b) COPY STRUCTURE TO <NEW FILE>

(c) COPY FILE <FILE 1> <FILE 2>

(d) COPY TO MFILE-DAT DELIMITED

Ans. (b) : Copy structure to <new file> is just copying the structure only.

11. B + tree are preferred to binary tree in Database because

(a) Disk capacity are greater than memory capacities

(b) Disk access is much slower than memory access

(c) Disk data transfer rates are much less than memory data transfer rate

(d) Disks are more reliable than memory

Ans. (b) : Disk access is much slower than memory access. The major advantage of B^+ tree is in reducing the number of last level access which would be from disk in case of large data size, so B+ tree preferred option (b).

12. A Transaction Manager is which of the following?

(a) Maintains a log of transactions

(b) Maintains before and after database images

(c) Maintains appropriate concurrency control

(d) All of the above

Ans. (d) : All of the above

Because transaction manager performs all the operation mentioned in option A, B & C. So the answer is option (d).

13. Leaves of which of the following trees are at the same level?

(a) Binary tree (b) B–tree

(c) AVL–tree (d) Expression tree

Ans. (b) : A **B–tree** is a tree data structure in which each node has at most two children, which one referred as left child and the right child.

According to Knuth's definition, a B-tree of order m is a tree which satisfies the following properties:

Every node has at most m children

Every non-leaf node has at least m/2 children

The root has at least two children if it is not leaf node.

A non-leaf node with k children contains (k-1) keys.

All leaves appear in the same level.

It cannot be guaranteed in binary tree, AVL tree and expression tree.

14. Which of the following TCP/IP Internet protocol is diskless machine uses to obtain its IP address from a server?

(a) RAP (b) RIP

(c) ARP (d) X. 25

Ans. (c) : Because, ARP (Address Resolution Protocol) is a protocol in TCP/IP protocol suite. This protocol is used for Basic TCP/IP Operations. ARP is used to find the Ethernet (H/W) address from a specific IP number.

15. Decryption and encryption of data are the responsibility of which of the following layer?

(a) Physical layer (b) Data Link layer

(c) Presentation layer (d) Session layer

Ans. (c) : Service by **Presentation layer:**

Data conversion

Character code translation

Compression

Encryption and decryption

16. In which circuit switching, delivery of data is delayed because data must be stored and retrieved from RAM?

(a) Space division (b) Time division

(c) Virtual (d) packet

Ans. (b) : Time division

Because, Time division multiplexing (TDM) is a method of transmitting and receiving independent signals over a common signal Path by means of synchronized switches at each end of the transmission line so that each signal appears on the line only a fraction of time in alternating pattern.

17. In which Routing Method do all the routers have a common database?

(a) Distance vector (b) Link state

(c) Link vector (d) Dijkestra method

Ans. (b) : Link state necessary database require more memory than a distance vector requires.

Link state, the complex algorithm requires more CPU time than a distance vector protocol requires.

The flooding of link state packets adversely affects available bandwidth, particularly in unstable internetworks.

18. Page Shift Keying (PSK) Method is used to modulate digital signal at 9600 bps using 16 level. Find the line signals and speed (i.e. Modulation rate).

(a) 2400 bauds (b) 1200 bauds

(c) 4800 bauds (d) 9600 bauds

Ans. (a) : 2400 bauds

Modulation	Baud rate	Bit rate
4 – PSK	N	2N
8 – PSK	N	3N
16 – PSK	N	4N

Because, two values are provided, one is bps which is nothing but bits per second which is 9600 and also level which is 16. According to table given above for a 16–PSK give a baud rate N. the bit rate would be 4N. Here bps is provides which is 9600. In order to calculate the baud rate we have to divide bs/4. Because the signal level is 16. So the answer would be 9600/4 = 2400 baud.

19. The station to hub distance in which it is 2000 metres.

(a) 100 Base-Tx (b) 100 Base-Fx
(c) 100 Base-T_4 (d) 100 Base-T_1

Ans. (b) : 100 Base-Fx

Fast Ethernet is refered by 100 Base-x standard has three specification. Here 100 refers to the speed.

1. 100 Base T4
2. 100 Base Tx
3. 100 Base Fx

$\Rightarrow$ 100 Base Fx uses the 2-standard fibre optic cable and the station to hub distance is 2000 meters.

20. Main aim of software engineering is to produce

(a) Program
(b) Software
(c) Within budget
(d) Software within budget in the given schedule

Ans. (d) : Because every software would be produce within the specific budget and in the specific time.

21. Key process areas of CMM level 4 are also classified by a process which is

(a) CMM level 2 (b) CMM level 3
(c) CMM level 5 (d) All of the above

Ans. (c) : CMM level 5

Because, In CMM Model there are five maturity levels is identified by the number 1 to 5. They are–

(1) Initial, (2) Managed, (3) Defined, (4) Quantitavely Managed, (5) Optimizing

If a organisation is at level 2. It means it has crossed over level 1 and the same holds true and subsequent levels. At level 4, the process at level 3 is also included. CMM Level 5 is not correct because the question only talks about level 4. CMM level 2 is not correct because level 3 includes level & as well. So option (c) is correct.

22. Validation means

(a) Are we building the product right
(b) Are we building the right product
(c) Verification of fields
(d) None of the above

Ans. (b) : Are we building the right product

Because validation means "are we building the right product" and verification means "are we building the product right".

23. If a process is under statistical control, then it is

(a) Maintainable (b) Measurable
(c) Predictable (d) Verifiable

Ans. (c) : Predictable is a real valued stochastic process whose values are known in a sense, just in advance of time. Because, predictable process is also said to be under statistical control.

24. In a function oriented design, we

(a) Minimize cohesion and maximize coupling
(b) Maximize cohesion and minimize coupling
(c) Maximize cohesion and maximize coupling
(d) Minimize cohesion and minimize coupling

Ans. (b) : Maximize cohesion and minimize coupling.

Because, the design purpose is to making coupling minimize and maximize the cohesion. Cohesion is a way to understand that how close or bound your module is, and coupling is the level of interactivity between modules for a good design to happen. Cohesion should be more and coupling should be less.

25. Which of the following metric does not depend on the programming language used?

(a) Line of code (b) Function count
(c) Member of token (d) All of the above

Ans. (b) : Function count.

Because function count does not depend on programming language. Function count are a unit of measure a software just like a unit of measure for temperature would be degree.

26. A/B + tree index is to be built on the name attribute of the relation STUDENT, Assume that all students names are of length 8 bytes, disk block are of size 512 bytes and index pointers are of size 4 bytes. Given this scenario what would be the best choice of the degree (i.e. number of pointers per node) of the B + tree?

(a) 16 (b) 42
(c) 43 (d) 44

Ans. (c) : (43)

Because, Now we see how it comes,

Let n be the degree

given, key size (length of the name attribute of student) = 8 bytes (k), index pointer size = 4 bytes (b)

Disk Block Size = 512 bytes

Degree of B+ tree can be calculated if we know the maximum number of key a internal code can have. The formula is,

$\Rightarrow$ (n–1) k + n * b = block size

$\Rightarrow$ (n–1) * 8 + n * 4 = 512

$\Rightarrow$ 8n – 8 – 4n = 512

$\Rightarrow$ 12 = 520

$\Rightarrow$ n = 520/12 = 43 (Option c)

27. The In order traversal of the tree will yield a sorted listing of elements of tree in

(a) Binary tree (b) Binary search tree

(c) Heaps (d) None of the above

Ans. (b) : Binary search tree

Because, In BST all elements to the root of the tree will lesser than the root. Also elements greater than the root will be right of the root, so the answer is Option (b)

28. Mobile IP provides two basic functions

(a) Route discovery and registration

(b) Agent discovery and registration

(c) IP binding and registration

(d) None of the above

Ans. (b) : Agent discovery and registration

Because, Mobile IP is the basic behind how wireless devices offer IP connectivity.

Agent discovery: A mobile node discovers its foreign and home agents during discovery.

Registration: the mobile node registers its current location with the foreign agent and him agent during registration. Are two basic functions involved here, so the option is (b).

29. Pre-emptive scheduling is the strategy of temporarily suspending a gunning process

(a) Before the CPU time slice expires

(b) To allow starving processes to run

(c) When it requests I/O

(d) To avoid collision

Ans. (a) : Before the CPU time slice expires

Because, Every process is allocated a specific time slice in the CPU and it runs for that entire time. In pre-emptive scheduling even before the process time slice expires. It is temporarily suspended from its execution. So the option is (a).

30. In round robin CPU scheduling as time quantum is increased the average turn around time

(a) Increases (b) Decreases

(c) Remains constant (d) Varies irregularly

Ans. (d) : Varies irregularly

Because, $\Rightarrow$ **Turn around time** is the interval of time between the submission of a process and its completion.

$\Rightarrow$ **Wait time** is the amount of time a process has been waiting in the ready queue

$\Rightarrow$ **Response time** is the time taken between the process submission and the first response produced.

In RR algorithm, value of time slice, plays a crucial role in deciding how effective the algorithm is. If quantum time is too small then it could be like context switching and if quantum time is high, the RR be haves like FCFS, the average response time varies irregularly. So the answer is option (d).

31. Resources are allocation to the process non-share below basis is :

(a) Mutual exclusion (b) Hold and wait

(c) No pre-emption (d) Circular wait

Ans. (a) : Mutual exclusion is a program object that prevents simultaneous access to a shared resource. This concept is used in concurrent programming with a critical section, a piece of code in which processes or threads access a shared resource.

32. Catch on and interleaved memories are ways of speeding up memory access between CPU and slower RAM. Which memory models are best suited (i.e. Improves the performance mostly which program)

(1) Cached memory is best suited for small loops.

(2) Interleaved memory is best suited for small loops

(3) Interleaved memory is best suited for large sequential code.

(4) Cached memory is best suited for large sequential code.

(a) 1 and 2 are true (b) 1 and 3 are true

(c) 4 and 2 are true (d) 4 and 3 are true

Ans. (b) : Interleaved memory is best suited for small 100 ps.

Because, Here multiple memory chips are grouped together to form what we are known as banks. Each of then take turns for supplying data. An interleaved memory with "n" banks is said to be n-way interleaved. Macintosh system are considered to be one using memory interleaving.

33. Consider the following page trace : 4, 3, 2, 1, 4, 3, 2, 1, 5 Percentage of page fault that would occur if FIFO page replacement algorithm is used with number of frame for JOB m = 4 will be :

(a) 8 (b) 9

(c) 10 (d) 12

Ans. (c) : 10

Because, reference string is 4, 3, 2, 1, 4, 3, 2, 1, 5

number of frames m = 4

⇒ First 4 references (4, 3, 2, 1) cause page faults and brought into empty frames

⇒ next reference (4) is already available and so there is no page fault

⇒ next reference (3) is also ready available and so there is no page fault

⇒ the next reference (5) replaces page 4 which was brought the first no. of page fault = 5

⇒ next reference (4) replace page 3 which is the next to come in no. of page faults = 6

⇒ next reference (3) replaces 2 no. of page faults till now = 7

⇒ next reference (2) replaces 1 a which was to last pages to come in no. of page fault till now = 8

⇒ next reference (1) replaces 5 which as the first to come in the second cycle no. of page faults till now = 9

⇒ the last reference in the reference string is 5 which will replace 4 no. of page faults till now = 10

⇒ the page faults are the 10 so the answer is option (c).

34. Check sum used along with each packet computes the sum of the data, where data is treated as a sequence of

(a) Integer (b) Character

(c) Real numbers (d) Bits

Ans. (b) : Character

Because, check sum is the error detecting mechanism when data is treated as a sequence of character. parity is a mechanism used when data is treated as a sequence of bits.

35. If an integer needs two bytes of storage, then the maximum value of a signed integer is

(a) $2^{16} - 1$ (b) $2^{15} - 1$

(c) 2^{16} (d) 2^{15}

Ans. (b) : $2^{15} - 1$

In case of magnitude Representation the Range is from $(2^{n-1}-1)$ to $(2^{n-1}-1)$

Min no. that can be represent in this system is $-(2^{n-1}-1)$

Max no. that can be represent in this system is $(2^{n-1}-1)$

In case 2's complement no. system the range is -2^{n-1} to $2^{n-1}-1$

Max no. that can be represent in this system $2^{n-1}-1$

So, Max no. can be represented here which $2^{n-1}-1$ is $2^{16}-1 \rightarrow 2^{15}-1$

36. Which of the following logic families is well suited for high-speed operations?

(a) TTI (b) ECL

(c) MOS (d) CMOS

Ans. (b) : ECL

Because, ECL (Emitter coupled logic) is a high speed integrated circuit bipolar transistor logic family.

37. Interrupts which are initiated by an instruction are

(a) Internal (b) External

(c) Hardware (d) Software

Ans. (c) : Hardware

Interrupts are of three types–(1) External interrupts, (2) Internal interrupts, (3) Software interrupts.

Hardware interrupts are used by devices to communicate that they require attention from the operating system.

38. printf("%c" 100)

(a) Prints 100

(b) Prints ASCII equivalent of 100

(c) Prints garbage

(d) None of the above

Ans. (b) : Prints ASCII equivalent of 100

Because the %c format prints the ASCII equivalent of the value.

39. For the transmission of the signal, Bluetooth wireless technology uses

(a) Time division multiplexing

(b) Frequency division multiplexing

(c) Time division duplex

(d) Frequency division duplex

Ans. (c) : Time division duplex is the application of time division multiplexing to separate outward and return signals.

Here Bluetooth technology uses time division duplex transmission duplex.

40. Consider the following statements

a. Recursive languages are closed under complementation.

b. Recursively enumerable languages are closed under union.

c. Recursively enumerable languages are closed under complementation.

Which of the above statements are true?

(a) 1 only (b) 1 and 2

(c) 1 and 3 (d) 2 and 3

Ans. (b) : 1 and 2

Because, recursive languages are closed under the following operations–

(1) Keene star, (2) concatenation, (3) union, (4) intersection, (5) complement, (6) set difference

Recursively enumerable languages are enclosed under the following operation.

(1) Keene star, (2) concatenation, (3) union, (4) intersection

Recursively enumerable languages are not closed under compliment, so the statement (1) and (2) are only true.

41. What is the routing algorithm used by RIP and IGRP?

(a) OSPF (b) Link-state

(c) Dynamic (d) Dijkstra vector

Ans. (d) : Dijkestra vector

Because, RIP (Routing information Protocol) and IGRP (interior Gateway Routing Protocol) are the example of distance Vector Routing Protocol and open shortest path (OSPF) is an example of Link State Routing Protocols. Distance vector algorithms are based on Belma and ford algorithm. Link State Routing Protocols is based on Dijkestra algorithm. So the options are OSPF, link state, dynamic are ruled out. So the answer is option (d).

42. Identify the incorrect statement

(a) The overall strategy drives the E-Commerce data warehousing strategy.

(b) Data warehousing in an E-Commerce environment should be done in a classical manner.

(c) E-Commerce opens up an entirely new world of web server.

(d) E-Commerce security threats can be grouped into three major categories.

Ans. (d) : The threat environment for E-Commerce data warehousing application, security threats can be grouped into three major categories.

Loss of data secrecy

Loss of data integrity

Loss of denial of service

Because, E-commerce security threats are more than 3 in number and so the incorrect statement is d.

43. Reliability of software is directly dependent on

(a) Quality of the design

(b) Number of errors present

(c) Software engineers experience

(d) User requirement

Ans. (b) : Software reliability is measured in term of Mean time between failures. Reliability of software is number between 0 and 1. Reliability increases when errors or bugs from the program are removed**,** so the option is b.

44. ..... is not an E-Commerce application.

(a) House banking

(b) Buying stocks

(c) Conducting an auction

(d) Evaluating an employee

Ans. (d) : Evaluating an employee is not an E-commerce application.

45. ..... is a satellite based tracking system that enables the determination of person's position.

(a) Bluetooth

(b) WAP

(c) Short Message Service

(d) Global Positioning System

Ans. (d) : Global Positioning System is a satellite based navigation system.

46. A complete microcomputer system consists of

(a) Microprocessor

(b) Memory

(c) Peripheral equipment

(d) All of the above

Ans. (d) : All of the above

Because, In complete microcomputer system there is a Microprocessor or and a memory part as well and there is peripheral equipment part is also there, so the correct option is (d).

47. Where does a computer add and compare data?

(a) Hard disk (b) Floppy disk

(c) CUP chip (d) Memory chip

Ans. (c) : CUP chip

Because, Hard disk, Floppy disk, Memory chip are the storage devices so these are ruled out and now the correct option is (c).

48. Pipelining strategy is called implement

(a) Instruction execution

(b) Instruction prefetch

(c) Instruction decoding

(d) Instruction manipulation

Ans. (b) : Instruction prefetch is often combined with pipelining in an attempt to keep the pipeline busy.

So the option is (b).

49. Which of the following data structure is linear type?

(a) Strings (b) Lists

(c) Queues (d) All of the above

Ans. (d) : All of the above

Because, strings, Link lists and queues are linear type data structure because the data of these option were arranged or organized in sequential or linearly, where data elements attached one after another.

50. To represent hierarchical relationship between elements, which data structure is suitable?

(a) Dequeue (b) Priority

(c) Tree (d) All of the above

Ans. (c) : A Tree structure is a way of representing the hierarchical nature of a structure in a graphical form.

so the answer is option (c).

U.G.C. NET Exam. June, 2012
COMPUTER SCIENCE
(Solved with Explanation Paper–III)

1. Consider the following pseudo code segment: K: = O for i1: = 1 to n for i2 : = 1 to i1 : For im: =1to im – 1 K: = K + 1 The value of K after the execution of this code shall be

(a) C (n + m – 1, m)
(b) C (n – m + 1, m)
(c) C (n + m – 1, n)
(d) C (n – 1 + 1, n)

Ans. (a) : C (n + m – 1, m)
Because, In order to understand the solution to this problem let us consider some sample value of n and m. Let us say n = 3 and m = 2. The value of m also decides the number of inner loop we have. When we say m = 2, the total number of loops we have is 2 only n decides the range of outer most loop, so the psudocode can be under stood as

```
k = 0
for i = 1 to n
for m = 1 to i
k = k + 1
```

⇒ For the value of n = 3 and m = 2, the value of k would be incriminated in following manner

l	m	k
1	1	1
2	1	2
2	2	3
3	1	4
3	2	5
3	3	6

⇒ Value of i ranges & rom 1 to n where n = 3

⇒ Value ko k is k = 6 at the end of iteration C (n + m -1/m) = C (3 + 2 - 2) = C (4, 2) = 4!/2! * 2! = 6.

⇒ So the answer is A

2. In Delta Rule for error minimization

(a) Weights are adjusted w.r. To change in the output
(b) Weights are adjusted w.r. To difference between desired output and actual output
(c) Weights are adjusted w.r. To difference between input and output
(d) None of the above

Ans. (b) : in delta rule for error minimization, weights are adjusted with respect to difference between desired output and actual output.

3. The concept of pipelining is most effective in improving performance if the tasks being performed in different stages:

(a) require different amount of time
(b) require about the same amount of time
(c) require different amount of time with time difference between any two tasks being same
(d) require different amount with time difference between any two tasks being different

Ans. (b) : Require about the same amount of time.
Because, Pipe lining is a technique to build fast processors it allows the execution of multiple instruction by overlapping them. Pipe lining can executes multiple instructions. So it requires the same amount of time. So that the answer is B.

4. What is Granularity?

(a) The size of database
(b) The size of data item
(c) The size of record
(d) The size of file

Ans. (b) : The size of data item is often called the data item granularity.

5. Suppose that given application is run on a 64-process or machine and that 70 percent of the application can be parallelized. Then the expected performance improvement using Amdahl's law is

(a) 4.22 (b) 3.22
(c) 3.32 (d) 3.52

Ans. (b) : 3.22
Because, According to Amdahl's law, in case of parallelization, if p is the proportion of the program that can be made parallel, then (1-p) is the proportion can be paralyzed. Then the maximum speedup that can be achieved by using N processor, S (N) = 1/(1-P) + P/N, where N refers the number of processor and P refers to the proportion that can be paralyzed.

6. If two fuzzy sets A and B are given with membership functions μA(x) = {0.2, 0.4, 0.8, 0.5, 0.1} μB(x) = {0.1, 0.3, 0.6, 0.3, 0.2} Then the value of μ —— A∩B will be

(a) {0.9, 0.7, 0.4, 0.8, 0.9}
(b) {0.2, 0.4, 0.8, 0.5, 0.2}
(c) {0.1, 0.3, 0.6, 0.3, 0.1}
(d) {0.7, 0.3, 0.4, 0.2, 0.7}

Ans. (a) :
Give two fuzzy set
$\mu_{\acute{A}}$ ={0,2,0.4,0.8, 0.5, 0.1}

$\mu_{\acute{A}}$ ={0.1,0.3,0.6,0.3,0.2}
so, $\mu_{\acute{A}}U_B(x)$= {0.2,0.4, 0.8, 0.5, 0.2}
and
$\mu_{\acute{A}}U_B(x)$= {0.8, 0.6, 0.2, 0.5, 0.8}
= 1-{0.1,0.3, 0.6, 0.3, 0.1}
={0.9, 0.7, 0.4, 0.7, 0.9}

7. Match the following:

(a) OLAP	1. Regression
(b) OLTP	2.Data Warehouse
(c) Decision Tree	3. RDBMS
(d) Neural Network	4. Classification

(a) 2 3 1 4 (b) 2 3 4 1
(c) 3214 (d) 3241

Ans. (b) : In OLTP database there is detailed and current data. In OLTP database schema used to store transaction data usually 3NF. OLAP is characterized by relatively low volume of transactions.
Decision tree is used for classification of data in data mining and AI.
Neural networks are used for the purpose of unsupervised learning, regression or classification.

8. Which level of Abstraction describes what data are stored in the Database?
(a) Physical level
(b) View level
(c) Abstraction level
(d) Logical level

Ans. (d) : Logical level
Because, Logical level describes what data are stored in the data base and what relationship among those data.

9. The problem that occurs when one transaction updates a database item and them the transaction fails for some reason is .....
(a) Temporary Select Problem
(b) Temporary Modify Problem
(c) Dirty Read Problem
(d) None

Ans (c) : The temporary (or dirty read) problem this problem occurs when one transaction updates a database item and then transaction fails for some reason. The updated item is accessed by another transaction before it is changed back to its original value.

10. In an image compression system $^{16}3^{84}$ bits are used to represent 256 × 256 image with 256 gray level. What is the compression ratio for this system?
(a) 1 (b) 2
(c) 4 (d) 8

Ans. (*) number of bits required to store a 256×256 image with 256 gray level is
256 gray level is=2^8
Therefore, compression ratio = 256×256×8/16384 =32

11. X.25 is ..... Network.
(a) Connection Oriented Network
(b) Connection less Network
(c) Either Connection Oriented or Connection Less
(d) Neither Connection Oriented nor Connection Less

Ans. (a) X.25 is an ITU-T standard protocol suite for packet switched Wide Area Network communication.
NSAP addressing facility was added in the X.25 revision of the specification, and this enabled X.25 to better meet the requirements of OSI connection-Oriented Network service (CONS).

12. Which of the following can be used for clustering of data?
(a) Single lever perception
(b) Multilayer Perception
(c) Self organizing map
(d) Radial basis function

Ans. (c) : Self Organizing map is a type of Artificial Neural Network that is trained using unsupervised learning to produce a low dimensional maps. In maps consisting of thousands of nodes, it is possible to perform cluster operations on the map itself.

13. Which of the following is scheme to deal with deadlock?
(a) Time out (b) Time in
(c) Both A & (B) (d) None of the above

Ans. (a) : Time out
Because, One of the strategy to avoid dead lock situation in java multithreading is using timeout. Suppose, one thread has acquired lock on one resource and now waiting for lock on another resource. After certain time period if it can not acquire lock on resource and then it should stop waiting for lock on resource 2. Also it should release lock on resource 1. Thus lock is avoided, so the Answer is a

14. It the pixels of an image are shuffled then the parameter that may change is
(a) Histogram (b) Mean
(c) Entropy (d) Covariance

Ans. (d) : Covariance
Because, Covariance is a measure of how much two random variable change together. So when pixel of an image suffered then covariance is changed.

15. The common property of functional language and logical programming language
(a) Both are declarative
(b) both are based on 1-calculus
(c) Both are procedural
(d) Both are functional

Ans. (a) : Both are declarative
Functional and logical programming languages are characterized by declarative programming style. In logical programming languages, programs consist of logical statements and program executes by searching for proof of the statements.

16. Given the following statements:
(1) The power of deterministic finite State machine and nondeterministic finite state machine are same
(2) The power of deterministic pushdown automaton and nondeterministic pushdown automaton are same
Which of the above is the correct statement (s)?
(a) Both 1 and 2 (b) Only 1
(c) Only 2 (d) Neither 1 nor 2

Ans. (b) : Only (1)
Because, we are now that finite machine is of two types one is deterministic finite state machine and the other one non deterministic finite state machine. Both machine accept regular language only, so the power of DFA = NFA, so the first statement is true.
There is no algorithm exist which convert NPDA into DPDA. So, power of NDPA is more than DPDA.
hence the answer is (b)

17. Let Q(x, y) denote "x + y = 0" and let there be two quantifications given as
(i) $\exists y \forall x$ **Q(x, y)**
(ii) $\forall x \exists y$ **Q(x, y) which of the following is valid? where x & y are real numbers. Then**
(a) (i) is true & (ii) is false.
(b) (i) is false & (ii) is true.
(c) (i) is false & (ii) is also false.
(d) both (i) & (ii) are true.

Ans. (b)
$\exists y \forall x$ Q(x+ y= 0) is false
Since for all x single y not exist whose addition produce result 0.
i.e., x+y = 0
$\forall x \exists y$ Q(x+ y=0) is true
Because for every x then exist y=-x whereas addition produce result as 0.

18. Consider a schema R (A. B. C. D) and functional dependencies A→B and C→D. Then the decomposition R_1 (A, B) and R_2 (C, D) is
(a) Dependency preserving but not lossless join
(b) Dependency preserving and lossless join
(c) Lossless join but not dependency preserving
(d) Lossless Join

Ans. (a) : Dependency preserving but not lossless join
Because, for lossless after decomposition of relation into if there is any common attribute in the decomposed relation and that attribute is key in any of relation then it is lossless.
Here no attribute are common R1 and R2
so this one is not lossless
For dependency from the dependencies of the spited schemas then it is dependency preserving
here from R1 === A → B from R2 === C → D can be divided so it is DP, then the answer is (a)

19. The quantiser in an image-compression system is a
(a) lossy element which exploits the psycho visual redundancy
(b) lossless element which exploits the psycho visual redundancy
(c) lossy element which exploits the statistical redundancy
(d) lossless element which exploits the statistical redundancy

Ans. (a) : Lossy element which exploits the psycho visual redundancy
Because, Quantization, involved in image processing is a lossy compression technique achieved by compressing a range of values to single quantum value. When the number of discrete symbols in a given stream is reduced and the stream becomes more compressible.
so the answer is a

20. Data Warehouse provides
(a) Transaction Responsiveness
(b) Storage. Functionality Responsiveness to queries
(c) Demand and Supply Responsiveness
(d) None of the above

Ans. (b) : Storage functionality responsiveness to queries
Because, data warehouses are supposed to provide storage functionality and responsiveness oriented databases. Also data warehouse are set to improve the data access performance of database.

21. A * algorithm f = g + h to estimate the cost of getting from the initial state to the goal state, where g is a measure of the cost of getting from initial state to the current node and the function h is an estimate of the cost of getting from the current node to the goal state. To find a path involving the fewest number of steps, we should set

(a) g = 1 (b) g = 0
(c) h = o (d) h = 1

Ans. (a) : g= 1
Because, a* algorithm is the most important form of best first search,
F = g + h
g is the measure of cost getting from initial to the current node and the function,
h is and estimate of the cost of getting from the current node to the goal state.
Now if want to find a path involving the first number of steps then we set the cost of going from a node to its successor (i.e. g) as a constant usually 1. hence the answer is a

22. The transform which possesses the highest 'energy compaction' property is

(a) Slant transform
(b) Cosine transforms
(c) Fourier transforms
(d) Karhunen-Loeve transforms

Ans. (d) : Karhunen-Loeve transforms
Because, most of the signal information is concentrated in few low frequency components of the transform, so approaching the Karjunen-Loeve transforms, which is optimal in the decor relation sense.

23. Which one of the following prolog programs correctly implement "if G succeeds then execute goal Pelse execute goal θ?

(a) if–else (G, P, θ) :– !, call (G), call (P).
if–else (G, P, θ) :– call (θ)
(b) if–else (G, P, θ) :– call (G), !, call (P).
if–else (G, P, θ) :–call (θ)
(c) if–else (G, P, θ) :– call (G), call (P), !.
if-else (G, P, θ) :– call (θ)
(d) All of the above

Ans. (b) : If G succeeds then execute goal P else execute goal θ :
If else (G, P, θ) : call (G), !, call (P)
If else (G, P, θ) : call (θ)

24. The ..... memory allocation function modifies the previous allocated space.

(a) cal loc () (b) free ()
(c) malloc () (d) real loc ()

Ans. (d) : real loc ()
Because, mal loc and cal loc are used to allocate dynamic memory.
free is used to frees the allocated memory be cal loc and mal loc
Real loc is used to reallocated or modifies the previous allocated space, hence the answer is d

25. Which is not the correct statement (s)?

(a) Every context sensitive language is recursive.
(b) There is a recursive language that is not context sensitive.
(i) 1 is true, 2 is false.
(ii) 1 is true and 2 is true.
(iii) 1 is false, 2 is false.
(iv) 1 is false and 2 is true.

Ans. (b) : Since context sensitive languages are subset of recursive languages.
Therefore, both statements are correct.

26. The mechanism that binds code and data together and keeps them secure from outside world is known as

(a) Abstraction (b) Inheritance
(c) Encapsulation (d) Polymorphism

Ans. (c) : Encapsulation is an OOP concept that binds together the data and functions that manipulate the data and that keeps both safe form outside interference and misuse. Data encapsulation led to the important OOP concept of data hiding.

27. Identify the addressing modes of below instructions and match them:

(a) ADI 1. Immediate addressing
(b) STA 2. Direct addressing
(c) CMA 3. Implied addressing
(d) SUB 4. Register addressing
(i) a – 1, b – 2, c – 3, d – 4
(ii) a – 2, b – 1, c – 4, d – 3
(iii) a – 3, b – 2, c – 1, d – 4
(iv) a – 4, b – 3, c – 2, d – 1

Ans. (a) : ADI. Immediate addressing
Because. the instruction ADI adds same content to the accumulator. It is an immediate addressing made instruction. The instruction STA stores the content of the accumulator in the particular memory location specified as operand, CMA takes complement of the contents of the accumulator. SUB instruction subtracts the content of the register to the contents of the accumulator.
Hence the answer is a