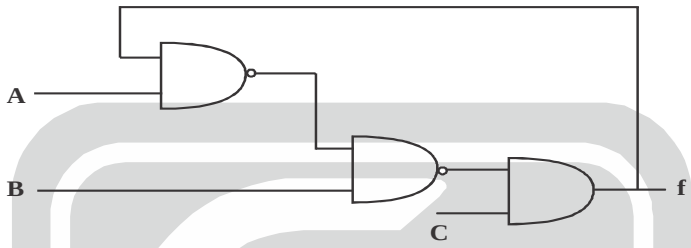
PAPER : DEC. 2012

UGC-NET COMPUTER SCIENCE & APPLICATIONS (87)

PAPER-II

Note: This paper contains **fifty (50)** objective type questions of **two (2)** marks each. All questions are compulsory.

1. Consider the circuit shown below. In a certain steady state, Y is at logical 'l'. What are possible values of A, B, C?



(a) A = 0, B = 0, C = 1 (b) A = 0, B = C = 1

(c) A = 1, B = C = 0 (d) A = B = 1, C = 1

2. The worst case time complexity of AVL tree is better in comparison to binary search tree for

(a) Search and Insert Operations (b) Search and Delete operations

(c) Insert and Delete Operation (d) Search, Insert and Delete operations

3. The GSM network is divided into the following three major systems:

(a) SS, BSS, OSS (b) BSS, BSC, MSC (c) CELL, BSC, OSS (d) SS, CELL, MSC

4. The power set of the set {ϕ} is

(a) {ϕ} (b) {ϕ, {ϕ}} (c) {0} (d) {0, ϕ, {ϕ}}

5. If the disk head is located initially at 32, find the number of disk moves required with FCFS if the disk queue of I/O blocks requests are : 98, 37, 14, 124, 65, 67.

(a) 239 (b) 310 (c) 321 (d) 325

6. Component level design is concerned with

(a) Flow oriented analysis (b) Class based analysis

(c) Both of the above (d) None of the above

7. The 'C' language is

(a) Context free language (b) Context sensitive language

(c) Regular language (d)None of the above

8. The Mobile application protocol (MAP) typically runs on top of which protocol?

(a) SNMP (Simple Network Management Protocol)

(b) SMTP (Simple Mail Transfer Protocol)

(c) SS7 (Signalling System 7)

(d) HTTP (Hyper Text Transfer Protocol)

9. If the packet arrive with an M-bit value is '1' and a fragmentation offset value '0', then it is .....fragment.
(a) First (b) Middle (c) Last (d) All of the above

10. The number of bit strings of length eight that will be either start with a 1 bit or end with two bits 00 shall be
(a) 32 (b) 64 (c) 128 (d) 160

11. In Compiler design 'reducing the strength' refers to
(a) reducing the range of values of input variables.
(b) code optimization using cheaper machine instructions
(c) reducing efficiency of program
(d) None of the above

12. In which addressing mode, the effective address of the operand is generated by adding a constant value to the contents of register?
(a) Absolute (b) Indirect (c) Immediate (d) Index

13. Which of the following is true ?
(a) A relation in BCNF is always in 3 NF (b) A relation in 3 NF is always in BCNF
(c) BCNF and 3 NF are same (d) A relation in BCNF is not in 3 NF

14. Given memory partitions of 100 K, 500 K, 200 K, 300 K and 600 K (in order) and processes of 212 K, 417 K, 112 K, and 426 K (in order), using the first-fit algorithm, in which partition would the process requiring 426 K be placed ?
(a) 500 K (b) 200 K (c) 300 K (d) 600 K

15. What is the size of the Unicode character in Windows operating system ?
(a) 8-Bits (b) 16-Bits (c) 32-Bits (d) 64-Bits

16. In which tree, for every node the height of its left subtree and right subtree differ almost by one?
(a) Binary search tree (b) AVL tree
(c) Threaded Binary Tree (d) Complete Binary Tree

17. The design issue of Datalink Layer in OSI Reference Model is
(a) Framing (b) Representation of bits
(c) Synchronization of bits (d) Connection control

18. Given the following expressions of a grammar

$E \rightarrow E * F / F + E / F$

$F \rightarrow F - F / id$

Which of the following is true ?
(a) * has higher precedence than + (b) – has higher precedence than *
(c) + and – have same precedence (d) + has higher precedence than *

19. The maturity levels used to measure a process are
(a) Initial, Repeatable, Defined, Managed, Optimized.
(b) Primary, Secondary, Defined, Managed, Optimized
(c) Initial, Stating, Defined, Managed, Optimized
(d) None of the above

20. The problem of indefinite blocage of low-priority jobs in general priority scheduling algorithm can be solved using :
(a) Parity bit (b) Aging (c) Compaction (d) Timer

21. Which API is used to draw a circle?
(a) Circle ( ) (b) Ellipse ( ) (c) Round Rect ( ) (d) Pie ( )

22. In DML, RECONNCT command cannot be used with
(a) OPTIONAL Set (b) FIXED Set (c) MANDATOR Set (d) All of the above

23. Coaxial cables are categorized by Radio Government rating are adapted for specialized functions. Category RG-59 with impedance 75Ω used for
(a) Cable TV (b) Ethernet (c) Thin Ethernet (d) Thick Ethernet

24. RAD stands for_____.
(a) Rapid and Design (b) Rapid Aided Development
(c) Rapid Application Development (d) Rapid Application Design

25. Suppose that someone starts with a chain letter. Each person who receives the letter is asked to send it on to 4 other people. Some people do this, while some do not send any letter. How many people have seen the letter, including the first person, if no one receives more than one letter and if the chain letter ends after there have been 100 people who read it but did not send it out ? Also find how many people sent out the letter?
(a) 122 & 22 (b) 111 & 11 (c) 133 & 33 (d) 144 & 44

26. A hash function f defined as f (key) = key mod 13, with linear probing is used to insert keys 55, 58, 68, 91, 27, 145. What will be the location of 79 ?
(a) 1 (b) 2 (c) 3 (d) 5

27. Which of the following is true while converting CFG to LL(I) grammar ?
(a) Remove left recursion alone (b) Factoring grammar alone
(c) Both of the above (d) None of the above

28. Identify the Risk factors which are associated with Electronic payment system.
(a) Fraudulent use of Credit Cards. (b) Sending Credit Card details over internet.
(c) Remote storage of Credit Card details. (d) All of the above

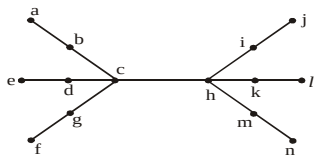
29. Which of the following are two special functions that are meant for handling exception, that occur during exception handling itself?
(a) Void terminate ( ) and Void unexpected ( )
(b) Non void terminate ( ) and void unexpected ( )
(c) Void terminate ( ) and non void unexpected ( )
(d) Non void terminate ( ) and non void unexpected ( )

30. Which of the following memory allocation scheme suffers from external fragmentation ?
(a) Segmentation (b) Pure demand Paging
(c) Swapping (d) Paging

31. Basis path testing falls under
(a) system testing (b) white box testing (c) black box testing (d) unit testing

32. The User Work Area (UWA) is a set of Program variables declared in the host program to communicate the contents of individual records between
(a) DBMS & the Host record (b) Host program and Host record
(c) Host program and DBMS (d) Host program and Host language

33. Consider the tree given below :



Using the property of eccentricity of a vertex, find every vertex that is the centre of the given tree.

(a) d & h (b) c & k (c) g, b, c, h, i, m (d) c & h

34. The maximum number of keys stored in a B-tree of order m and depth d is

(a) md + 1 – 1 (b) $\frac{md+1-1}{m-1}$ (c) (m – 1) (md + 1 – 1) (d) $\frac{md-1}{m-1}$

35. Which of the following is the most powerful parsing method?

(a) LL(I) (b) Canonical LR (c) SLR (d) LALR

36. In UNIX, which of the following command is used to set the task priority?

(a) init (b) nice (c) kill (d) PS

37. AES is a round cipher based on the Rijndal Algorithm that uses a 128-bit block of data. AES has three different configurations._____ rounds with a key size of 128 bits, _____ rounds with a key size of 192 bits and _____ rounds with a key size of 256 bits.

(a) 5, 7, 15 (b) 10, 12, 14 (c) 5, 6, 7 (d) 20, 12, 14

38. Match the following IC families with their basic circuits :

A. TTL	1. NAND
B. ECL	2. NOR
C. CMOS	3. Inverter

(a) A-1, B-2, C-3 (b) A-3, B-2, C-1 (c) A-2, B-3, C-1 (d) A-2, B-1, C-3

39. Match the following with respect to C++ data types :

A. User defined type	1. Qualifier
B. Built in type	2. Union
C. Derived type	3. Void
D. Long double	4. Pointer

(a) A-2, B-3, C-4, D-1 (b) A-3, B-1, C-4, D-2
(c) A-4, B-1, C-2, D-3 (d) A-3, B-4, C-1, D-2

40. Given an empty stack, after performing push (1), push (2), Pop, push (3), push (4), Pop, Pop, push (5), Pop, what is the value of the top of the stack?

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

41. Enumeration is a process of
(a) Declaring a set of numbers
(b) Sorting a list of strings
(c) Assigning a legal values possible for a variable
(d) Sequencing a list of operators

42. Which of the following mode declaration is used in C++ to open a file for input ?

(a) ios : : app (b) in : : ios (c) ios : : file (d) ios : : in

43. Data Encryption Techniques are particularly used for_____.
(a) protecting Data in Data Communication System
(b) reduce Storage space requirement
(c) enhances Data Integrity
(d) decreases Data Integrity

44. Let L be a set accepted by a non deterministic finite automaton. The number of states in non-deterministic finite automation is |Q|. The maximum number of states in equivalent finite automaton that accepts L is
(a) |Q| (b) 2|Q| (c) $2^{|Q|} - 1$ (d) $2^{|Q|}$

45. What is the result of the following expression ?
(1 & 2) + (3 & 4)
(a) 1 (b) 3 (c) 2 (d) 0

46. Back Propagation is a learning technique that adjusts weights in the neural network by propagating weight changes.
(a) Forward from source to sink (b) Backward from sink to source
(c) Forward from source to hidden nodes (d) Backward from since to hidden nodes

47. Match the following :

A. TTL	1. High fan out
B. ECL	2. Low propagation delay
C. CMOS	3. High power dissipation

Code:

	A	B	C
(a)	3	2	1
(b)	1	2	3
(c)	1	3	2
(d)	3	1	2

48. _____ is an "umbrella" activity that is applied throughout the software engineering process.
(a) Debugging (b) Testing (c) Desiging (d) Software quality assurance

49. Identify the operation which is commutative but not associative ?
(a) OR (b) NOR (c) EX - OR (d) NAND

50. Given a Relation POSITION (Posting - NO, Skill), then query to retrieve all distinct pairs of posting - nos. requiring skill is
(a) Select p.posting-No, p.psoting-No
from position p
where p.skill = p.skill
and p.posting-No < p.posting-No
(b) Select p_1.posting-No, p_2.posting-No
from position p_1, position p_2
where p_1.skill = p_2.skill
(c) Select p_1.posting-No, p_2.posting-No
from position p_1, position p_2
where p_1.skill = p_2.skill
and p_1.posting-No < p_2.posting-No
(d) Select p_1.posting-No, p_2.posting-No
from position p_1,position p_2
where p_1.skill = p_2.skill
and p_1.posting-No = p_2.posting-No

PAPER : DEC. 2012

UGC-NET COMPUTER SCIENCE & APPLICATIONS (87)

PAPER-III

Note: This paper contains **seventy fiive (75)** objective type questions of **two (2)** marks each. All questions are compulsory.

1. Eco system is Frame work for
   (a) Building a Computer System (b) Building Internet System
   (c) Building Offline Market (d) Building Market

2. The efficiency (E) and speedup (s_p) for Multiprocessor with p processors satisfies :
   (a) $E \leq p$ and $s_p \leq p$ (b) $E \leq 1$ and $s_p \leq p$
   (c) $E \leq p$ and $s_p \leq 1$ (d) $E \leq 1$ and $s_p \leq 1$

3. Match the following :

List - I	**List - II**
A. Critical region	1. Hoares Monitor
B. Wait/signal	2. Mutual exclusion
C. Working set	3. Principal of Locality
D. Dead lock	4. Circular wait

Codes :

	A	B	C	D
(a)	2	1	3	4
(b)	1	2	4	3
(c)	2	3	1	4
(d)	1	3	2	4

4. The technique of temporarily delaying outgoing acknowledgements so that they can be hooked onto the next outgoing data frame is known as
   (a) Bit stuffing (b) Piggy backing (c) Pipelining (d) Broadcasting

5. _____ is process of extracting previously non known valid and actionable information from large data to make crucial business and strategic decisions.
   (a) Data Management (b) Data Base (c) Data Mining (d) Meta Data

6. The aspect ratio of an image is defined as
   (a) The ratio of width to its height measured in unit length.
   (b) The ratio of height to width measured in number of pixels.
   (c) The ratio of depth to width measured in unit length.
   (d) The ratio of width to depth measured in number of pixels.

7. Which of the following features will characterize an OS as multiprogrammed OS ?
   (A) More than one program maybe loaded into main memory at the same time.
   (B) If a program waits for certain event another program is immediately scheduled.
   (C) If the execution of a program terminates, another program is immediately scheduled.
   (a) A only (b) A and B only (c) A and C only (d) A, B and C only

8. Using RSA algorithm, what is the value of cipher text C, if the plain text M = 5 and p = 3, q = 11 and d = 7?
   (a) 33 (b) 5 (c) 25 (d) 26

9. You are given an OR problem and a XOR problem to solve. Then, which one of the following statements is true ?
(a) Both OR and XOR problems can be solved using single layer perception.
(b) OR problem can be solved using single layer perception and XOR problem can be solved using self organizing maps.
(c) OR problem can be solved using radial basis function and XOR problem can be solved using single layer perception.
(d) OR problem can be solved using single layer perception and XOR problem can be solved using radial basis function.

10. Match the following :

List - I	**List - II**
A. Application layer	1. TCP
B. Transport layer	2. HDLC
C. Network layer	3. HTTP
D. Data link layer	4. BGP

Codes :

	A	B	C	D
(a)	2	1	4	3
(b)	3	4	1	2
(c)	3	1	4	2
(d)	2	4	1	3

11. The time complexities of some standard graph algorithms are given. Match each algorithm with its time complexity ? (n and m are number of nodes and edges respectively)

A. Bellman Ford algorithm	1. O (m log n)
B. Kruskals algorithm	2. O (n^3)
C. Floyd Warshall algorithm	3. O (mn)
D. Topological sorting	4. O (n + m)

Codes:

	A	B	C	D
(a)	3	1	2	4
(b)	2	4	3	1
(c)	3	4	1	2
(d)	2	1	3	4

12. Let $V_1 = 2I - J + K$ and $V_2 = I + J - K$, then the angle between V_1 and V_2 and a vector perpendicular to both V_1 and V_2 shall be :
(a) 90º and (– 2I + J – 3K)
(b) 60º and (2I + J + 3K)
(c) 90º and (2I + J –3K)
(d) 90º and (– 2I – J + 3K)

13. Consider a fuzzy set A defined on the interval X = [0, 10] of integers by the membership Junction

$$\mu_A(x) = \frac{x}{x+2}$$

Then the α cut corresponding to $\alpha = 0.5$ will be
(a) {0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10}
(b) {1, 2, 3, 4, 5, 6, 7, 8, 9, 10}
(c) {2, 3, 4, 5, 6, 7, 8, 9, 10}
(d) { }

14. Let T(n) be the function defined by T(n) = 1 and T(n) = 2T (n/2) + $\sqrt{n}$, which of the following is TRUE ?

(a) $T(n) = O\left(\sqrt{n}\right)$ (b) $T(n) = O(\log_2 n)$ (c) $T(n) = O(n)$ (d) $T(n) = O(n^2)$

15. In classful addressing, an IP address 123.23.156.4 belongs to _____ class format.
(a) A (b) B (c) C (d) D

16. The mandelbrot set used for the construction of beautiful images is based on the following transformation :

$$x_{n+1} = x_n^2 + z$$

Here,
(a) Both x and z are real numbers. (b) Both x and z are complex numbers.
(c) x is real and z is complex (d) x is complex and z is real.

17. Which of the following permutations can be obtained in the output using a stack of size 3 elements assuming that input, sequence is 1, 2, 3, 4, 5 ?
(a) 3, 2, 1, 5, 4 (b) 5, 4, 3, 2, 1 (c) 3, 4, 5, 2, 1 (d) 3, 4, 5, 1, 2

18. In a Linear Programming Problem, suppose there are 3 basic variables and 2 non-basic variables, then the possible number of basic solutions are
(a) 6 (b) 8 (c) 10 (d) 12

19. Identify the following activation function :

$$\phi(V) = Z + \frac{1}{1+\exp(-x*V+Y)},$$

Z, X, Y are parameters
(a) Step function (b) Ramp function (c) Sigmoid function (d) Gaussian function

20. The number of ways to distribute n distinguishable objects into k distinguishable boxes, so that n_i objects are placed into box i, i = 1, 2, ... k equals which of the following ?

(a) $\frac{n!}{n_1!+n_2!+.....+n_k!}$ (b) $\frac{n_1!+n_2!+....+n_k!}{n_1!n_2!n_3!.....n_k!}$

(c) $\frac{n_1!}{n_1!n_2!n_3!.....n_k!}$ (d) $\frac{n_1!n_2!....n_k!}{n_1!-n_2!-n_3!.....-n_k!}$

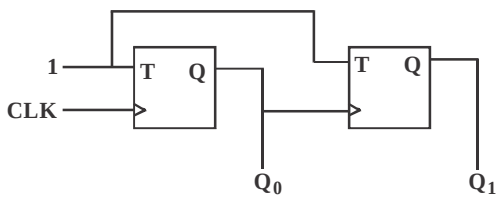
21. How many solution do the following equation have

$$x_1 + x_2 + x_3 = 11$$

where $x_1 \geq 1, x_2 \geq 2, x_3 \geq 3$
(a) C (7, 11) (b) C (11, 3) (c) C (14, 11) (d) C (7,5)

22. Which provides an interface to the TCP/IP suit protocols in Windows95 and Windows NT ?
(a) FTP Active- X Control (b) TCP/IP Active-X Control
(c) Calinsock Active-X Control (d) HTML Active-X Control

23. What are the final values of Q_1 and Q_0 after 4 clock cycles, if initial values are 00 in the sequential circuit shown below :



(a) 11 (b) 10 (c) 01 (d) 00

24. If dual has an unbounded solution, then its corresponding primal has
(a) no feasible solution (b) unbouded solution
(c) feasible solution (d) none of these

25. The number of distinct bracelets of five beads made up of red, blue, and green beads (two bracelets are indistinguishable if the rotation of one yield another) is,
(a) 243 (b) 81 (c) 51 (d) 47

26. Which are the classifications of data used in Mobile Applications ?
(a) Private data, User data, Shared data. (b) Public data, User data, Virtual data.
(c) Private data, Public data, Shared data. (d) Public data, Virtual data, User data.

27. In an enhancement of a CPU design, the speed of a floating point unit has been increased by 20% and the speed of a fixed point unit has been increased by 10%. What is the overall speed achieved if the ratio of the number of floating point operations is 2 : 3 and the floating point operation used to take twice the time tak en by the fixed point operation in original design ?
(a) 1.62 (b) 1.55 (c) 1.85 (d) 1.186

28. The initial basic feasible solution to the following transportation problem using Vogel's approximation method is

	D_1	D_2	D_3	D_4	Supply
S_1	1	2	1	4	30
S_2	3	3	2	1	50
S_3	4	2	5	9	20
Demand	20	40	30	10	

(a) $x_{11} = 20$, $x_{13} = 10$, $x_{21} = 20$, $x_{23} = 20$, $x_{24} = 10$, $x_{32} = 10$, Total cost = 180
(b) $x_{11} = 20$, $x_{12} = 20$, $x_{13} = 10$, $x_{22} = 20$, $x_{23} = 20$, $x_{24} = 10$, Total cost = 180
(c) $x_{11} = 20$, $x_{13} = 10$, $x_{22} = 20$, $x_{23} = 20$, $x_{24} = 10$, $x_{32} = 10$, Total cost = 180
(d) None of the above

29. 58 lamps are to be connected to a single electric outlet by using an extension board each of which has four outlets. The number of extension boards needed to connect all the light is
(a) 29 (b) 28 (c) 20 (d) 19

30. Match the following with respect to the Mobile Computing Architecture.

A. Downlink control	1. 100 Mbps
B. Radio communication data rate	2. Residency latency (RL)
C. The average duration of user's stay in cell	3. Sending data from a BS to MD
D. FDDI bandwidth	4. 2-Mbps

Codes :

	A	B	C	D
(a)	2	1	4	3
(b)	3	4	2	1
(c)	4	3	2	1
(d)	4	3	1	2

31. Which of the following flags are set when 'JMP' instruction is executed ?
(a) SF and CF (b) AF and CF (c) All flags (d) No flag is set

32. A thread is a light weight process. In the above statement, weight refers to
(a) time (b) number of resources
(c) speed (d) All the above

33. The Z-buffer algorithm is used for Hidden surface removal of objects. The maximum number of objects that can be handled by this algorithm shall
(a) Depend on the application (b) be arbitrary number of objects
(c) Depend on the memory availability (d) Depend on the processor

34. The power set of $A \cup B$, where A = {2, 3, 5, 7} and B = {2, 5, 8, 9} is
(a) 256 (b) 64 (c) 16 (d) 4

35. In Win32, which function is used to create Windows Applications ?
(a) Win APP (b) Win API (c) Win Main (d) Win Void

36. Suppose a processor does not have any stack pointer registers, which of the following statements is true ?
(a) It cannot have subroutine call instruction.
(b) It cannot have nested subroutine calls.
(c) Interrupts are not possible.
(d) All subroutine calls and interrupts are possible.

37. Everything below the system call interface and above the physical hardware is known as _____.
(a) Kernel (b) Bus (c) Shell (d) Stub

38. Which is not the correct statement ?
(a) The class of regular sets is closed under homomorphisms.
(b) The class of regular sets is not closed under inverse homomorphisms.
(c) The class of regular sets is closed under quotient.
(d) The class of regular sets is closed under substitution.

39. When a programming Language has the capacity to produce new datatype, it is called as,
(a) Overloaded Language (b) Extensible Language
(c) Encapsulated Language (d) Abstraction Language

40. Which of the following operating system is better for implementing client-server network ?
(a) Windows 95 (b) Windows 98 (c) Windows 2000 (d) All of these

41. Consider a system having m resources of the same type. These resources are shared by 3 processes A, B and C which have peak demands of 3, 4 and 6 respectively. For what value of m deadlock will not occur ?
(a) 7 (b) 9 (c) 10 (d) 13

42. The grammer 'G1'
$S \rightarrow 0S0|1S1|\ 0|1|\in$ and the grammer 'G2'is
$S \rightarrow aS\ |aSb|\ X,\ X \rightarrow Xa\ |\ a.$
Which is the correct statement ?
(a) G1 is ambiguous, G2 is unambiguous (b) G1 is unambiguous, G2 is ambiguous
(c) Both G1 and G2 are ambiguous (d) Both G1 and G2 are unambiguous

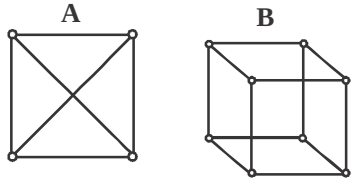
43. Consider n processes sharing the CPU in round robin fashion. Assuming that each process switch takes s seconds. What must be the quantum size q such that the overhead resulting from process switching is minimized but, at the same time each process is guaranteed to get its turn at the CPU at least every t seconds ?

(a) $q \le \frac{t-ns}{n-1}$ (b) $q \ge \frac{t-ns}{n-1}$ (c) $q \le \frac{t-ns}{n+1}$ (d) $q \ge \frac{t-ns}{n+1}$

44. The default Parameter Passing Mechanism is called as
(a) Call by Value (b) Call by Reference (c) Call by Address (d) Call by Name

45. Which of the following regular expression identities are true ?
(a) (r + s)* = r* s* (b) (r + s)* = r* + s* (c) (r + s)* = (r*s*)* (d) r* s* = r* + s*

46. Two graphs A and B are shown below : Which one of the following statement is true ?



(a) Both A and B are planar. (b) Neither A nor B is planar.
(c) A is planar and B is not. (d) B is planar and A is not.

47. The minimum number of states of the non-deterministic finite automation which accepts the language

$\{ a\ b\ a\ b^n | n \geq 0\} \cup \{a\ b\ a^n | n \geq 0)\}$ is

(a) 3 (b) 4 (c) 5 (d) 6

48. Functions defined with class name are called as

(a) Inline function (b) Friend function (c) Constructor (d) Static function

49. Let f be the fraction of a computation (in terms of time) that is parallelizable, P the number of processors in the system, and s_p the speed up achievable in comparison with sequential execution – then the s_p can be calculated using the relation :

(a) $\frac{1}{(1-f)-f/P}$ (b) $\frac{P}{P-f(P+1)}$ (c) $\frac{1}{1-f+f/P}$ (d) $\frac{P}{P+f(P-1)}$

50. Which of the following definitions generates the same Language as L, where

$L = \{WW^R \mid W \in \{a, b\}^*\}$

(a) $S \rightarrow aSb|bSa|\in$ (b) $S \rightarrow aSa|bSb|\in$
(c) $S \rightarrow aSb|bSa|aSa|bSb|\in$ (d) $S \rightarrow aSb|bSa|aSa|bSb$

51. Suppose there are logn sorted lists of n logn elements each. The time complexity of producing a sorted list of all these elements is (use heap date structure)

(a) O (n log log n) (b) θ (n log n) (c) Ω (n log n) (d) $\Omega(n^{3/2})$

52. Consider the program below in a hypothetical programming language which allows global variables and a choice of static or dynamic scoping

```
int i ;
program Main()
    {
        i = 10;
        call f ();
    }
    procedure f()
    {
        int i = 20;
        call g ();
    }
    procedure g ()
    {
    print i;
    }
```

Let x be the value printed under static scoping and y be the value printed under dynamic scoping. Then x and y are

(a) x = 10, y = 20 (b) x = 20, y = 10 (c) x = 20, y = 20 (d) x = 10, y = 10

53. If the parse tree of a word w generated by a Chomsky normal form grammar has no path of length greater than i, then the word w is of length
(a) no greater than 2^{i+1} (b) no greater than 2^{i}
(c) no greater than 2^{i-1} (d) no greater than i

54. The Object Modelling Technique (OMT) uses the following three kinds of model to describe a system
(a) Class Model, Object Model and Analysis Model.
(b) Object Model, Dynamic Model, and Functional Model.
(c) Class Model, Dynamic Model and Functional Model.
(d) Object Model, Analysis Model and Dynamic Model.

55. The factors that determine the quality of a software system are
(a) correctness, reliability
(b) efficiency, usability, maintainability
(c) testability, portability, accuracy, error tolerances, expendability, access control, audit
(d) All of the above

56. If a relation with a Schema R is decomposed into two relations R_1 and R_2 such that $(R_1 \cup R_2) = R_1$ then which one of the following is to be satisfied for a lossless joint decomposition ($\rightarrow$ indicates functional dependency)
(a) $(R_1 \cap R_2) \rightarrow R_1$ or $R_1 \cap R_2 \rightarrow R_2$ (b) $R_1 \cap R_2 \rightarrow R_1$
(c) $R_1 \cap R_2 \rightarrow R_2$ (d) $R_1 \cap R_2 \rightarrow R_2$ and $R_1 \cap R_2 \rightarrow R_2$

57. Given the following statements :
(i) Recursive enumerable sets are closed under complementation.
(ii) Recursive sets are closed under complementation.
Which is/are the correct state ments ?
(a) only (i) (b) only (ii) (c) both (i) and (ii) (d) neither (i) nor (ii)

58. Skolmization is the process of
(a) bringing all the quantifiers in the beginning of a formula in FDL.
(b) removing all the universal quantifiers.
(c) removing all the existential quantifiers.
(d) all of the above.

59. Which level of Abstraction describes how data are stored in the data base ?
(a) Physical level (b) View level (c) Abstraction level (d) Logical level

60. The transform which possesses the "multi-resolution" property is
(a) Fourier transform (b) Short-time-Fourier transform
(c) Wavelet transform (d) Karhunen-Loere transform

61. Which one is a collection of templates and rules ?
(a) XML (b) CSS (c) DHTML (d) XSL

62. A program P calls two subprograms P_1 and P_2. P_1 can fail 50% times and P_2 40% times. Then P can fail
(a) 50% (b) 60% (c) 10% (d) 70%

63. Third normal form is based on the concept of _____ .
(a) Closure Dependency (b) Transitive Dependency
(c) Normal Dependency (d) Functional Dependency

64. If the Fourier transform of the function f(x, y) is F(m, n), then the Fourier transform of the function f(2x, 2y) is :

(a) $\frac{1}{4}F\left(\frac{m}{2},\frac{n}{2}\right)$ (b) $\frac{1}{4}F(2m,2n)$ (c) $\frac{1}{4}F(m,n)$ (d) $\frac{1}{4}F\left(\frac{m}{4},\frac{n}{4}\right)$

65. _____ establishes information about when, why by whom changes are made in a software.
(a) Software Configuration Management. (b) Change Control.
(c) Version Control. (d) An Audit Trail.

66. Match the following with respect to HTML tags and usage.

A. CITE	1. Italic representation
B. EM	2. Represents output from programmes
C. VAR	3. Represents to other source
D. SAMP	4. Argument to a programme

Codes :

	A	B	C	D
(a)	3	1	4	2
(b)	2	3	1	4
(c)	4	2	3	1
(d)	1	3	4	2

67. An expert system shell is an expert system without
(a) domain knowledge (b) explanation facility
(c) reasoning with knowledge (d) all of the above

68. An example of a dictionary-based coding technique is
(a) Run-length coding (b) Huffman coding (c) Predictive coding (d) LZW coding

69. Which is the method used to retrieve the current state of a check box ?
(a) get State ( ) (b) put State ( ) (c) retrieve State ( ) (d) write State ( )

70. Referential integrity is directly related to
(a) Relation key (b) Foreign key (c) Primary key (d) Candidate key

71. You are given four images represented as

$$I_1=\begin{bmatrix}0 & 0\\ 0 & 0\end{bmatrix},\quad I_2=\begin{bmatrix}0 & 1\\ 0 & 0\end{bmatrix},\quad I_3=\begin{bmatrix}0 & 1\\ 1 & 0\end{bmatrix},\quad I_4=\begin{bmatrix}1 & 1\\ 1 & 0\end{bmatrix}$$

The value of entropy is maximum for image
(a) I_1 (b) I_2 (c) I_3 (d) I_4

72. A cryptarithmetic problem of the type

$$\begin{array}{r} \text{SEND} \\ +\ \text{MORE} \\ \hline \text{MONEY} \end{array}$$

can be solved efficiently using
(a) depth first technique (b) breadth first technique
(c) constraint satisfaction technique (d) bidirectional technique

73. Match the following :

A. Supervised learning	1. The decision system receives rewards for its action at the end of a sequence of steps.
B. Unsupervised learning	2. Manual labels of inputs are not used.
C. Reinforcement learning	3. Manual lables of inputs are used.
D. Inductive learning	4. System learns by example

Codes :

	A	B	C	D
(a)	1	2	3	4
(b)	2	3	1	4
(c)	3	2	4	1
(d)	3	2	1	4

74. A* algorithm is guaranteed to find an optimal solution if

(a) h' is always 0. (b) g is always 1.

(c) h' never overestimates h. (d) h' never underestimates h.

75. Let $\theta(x, y, z)$ be the statement "x + y = z" and let there be two quantifications given as

(i) $\forall x \forall y \exists Z \theta(x, y, z)$ (ii) $\exists Z \forall x \forall y \theta(x, y, z)$

Where x, y, z are real numbers. Then which one of the following is correct ?

(a) (i) is true and (ii) is true. (b) (i) is true and (ii) is false.

(c) (i) is false and (ii) is true. (d) (i) is false and (ii) is false.