

PAPER : JUNE 2013

UGC-NET COMPUTER SCIENCE & APPLICATIONS (87)

PAPER-II

Note: This paper contains **fifty(50)** objective type questions for **two (2)** marks each. **All** questions are compulsory. The candidates are required to select the most appropriate answer of each question.

1. COCOMO stands for
(a) COmposite COst MOdel (b) COnstructive COst MOdel
(c) COnstructive COmposite MOdel (d) COmprehensive COnstruction MOdel
2. Match the following:
(A) Good quality (i) Program does not fail for specified time in a given environment
(B) Correctness (ii) Meets the functional requirements
(C) Predictable (iii) Meets both functional and non-functional requirements
(D) Reliable (iv) Process is under statistical control
Codes:

	A	B	C	D
(a)	(iii)	(ii)	(iv)	(i)
(b)	(ii)	(iii)	(iv)	(i)
(c)	(i)	(ii)	(iv)	(iii)
(d)	(i)	(ii)	(iii)	(iv)
3. While estimating the cost of software. Lines of Code (LOC) and Function Points (FP) are used to measure which one of the following?
(a) Length of code (b) Size of software
(c) Functionality of software (d) None of the above.
4. A good software design must have
(a) High module coupling, High module cohesion
(b) High module coupling, Low module cohesion
(c) Low module coupling, High module cohesion
(d) Low module coupling, Low module cohesion
5. Cyclometric complexity of a flow graph G with n vertices and e edges is
(a) $V(G) = e + n - 2$ (b) $V(G) = e - n + 2$ (c) $V(G) = e + n + 2$ (d) $V(G) = e - n - 2$
6. When the following code is executed what will be the value of x and y?

```
int x = 1, y = 0;  
y = x++;
```


(a) 2, 1 (b) 2, 2 (c) 1, 1 (d) 1, 2
7. How many values can be held by an array A(-1, m; 1, m)?
(a) m (b) m^2 (c) $m(m + 1)$ (d) $m(m+2)$
8. What is the result of expression $(1 \& 2) + (3/4)$?
(a) 1 (b) 2 (c) 3 (d) 0
9. How many times the word 'print' shall be printed by the following program segment?

```
for (i = 1, i ≤ 2, i++)  
for (j = 1, j ≤ 2, j++)  
for (k = 1, k ≤ 2, k++)  
printf("print/n")
```


(a) 1 (b) 3 (c) 6 (d) 8

10. Which of the following is not a type of Database Management System?
(a) Hierarchical (b) Network (c) Relational (d) Sequential
11. Manager's salary details are to be hidden from Employee Table. This Technique is called as
(a) Conceptual level Datahiding (b) Physical level Datahiding
(c) External level Datahiding (d) Logical level Datahiding
12. A Network Schema
(a) restricts to one to many relationship (b) permits many to many relationship
(c) stores data in a database (d) stores data in a relation
13. Which normal form is considered as adequate for usual database design?
(a) 2NF (b) 3NF (c) 4NF (d) 5NF
14. If D_1, D_2, \dots, D_n are domains in a relational model, then the relation is a table, which is a subset of
(a) $D_1 + D_2 + \dots + D_n$ (b) $D_1 \times D_2 \times \dots \times D_n$
(c) $D_1 \cup D_2 \cup \dots \cup D_n$ (d) $D_1 - D_2 - \dots - D_n$
15. Which of the following addresses is used to deliver a message to the correct application program running on a host?
(a) Port (b) IP (c) Logical (d) Physical
16. In _____ substitution, a character in the plaintext is always changed to the same character in the ciphertext, regardless of its position in the text.
(a) polyalphabetic (b) monoalphabetic (c) transpositional (d) multialphabetic
17. In classful addressing, the IP address 190.255.254.254 belongs to
(a) Class A (b) Class B (c) Class C (d) Class D
18. In hierarchical routing with 4800 routers, what region and cluster sizes should be chosen to minimize the size of the routing table for a three layer hierarchy?
(a) 10 clusters, 24 regions and 20 routers (b) 12 clusters, 20 regions and 20 routers
(c) 16 clusters, 12 regions and 25 routers (d) 15 clusters, 16 regions and 20 routers.
19. In IPv4 header, the _____ field is needed to allow the destination host to determine which datagram a newly arrived fragments belongs to
(a) identification (b) fragment offset (c) time to live (d) header checksum
20. Given $L_1 = L(a^*baa^*)$ and $L_2 = L(ab^*)$. The regular expression corresponding to language $L_3 = L_1/L_2$ (right quotient) is given by
(a) a^*b (b) a^*baa^* (c) a^*ba^* (d) None of the above.
21. Given the production rules of a grammar G_1 as
 $S_1 \rightarrow AB \mid aaB$; $A \rightarrow a \mid Aa$; $B \rightarrow b$
and the production rules of a grammar G_2 as $S_2 \rightarrow aS_2bS_2 \mid bS_2aS_2 \mid \lambda$
Which of the following statement is correct statement?
(a) G_1 is ambiguous and G_2 is not ambiguous
(b) G_1 is ambiguous and G_2 is ambiguous
(c) G_1 is not ambiguous and G_2 is ambiguous
(d) G_1 is not ambiguous and G_2 is not ambiguous
22. Given a grammar: $S_1 \rightarrow Sc$, $S \rightarrow SA \mid A$, $A \rightarrow aSb \mid ab$, there is a rightmost derivation
 $S_1 \Rightarrow Sc \Rightarrow SAc \Rightarrow SaSbc$
Thus, $SaSbc$ is a right sentential form, and its handle is
(a) SaS (b) bc (c) Sbc (d) aSb

31. Repository of information gathered from multiple sources, storing under unified scheme at a single site is called as
 (a) Data mining (b) Meta data (c) Data warehousing (d) Database
32. The task of correcting and pre-processing data is called as
 (a) Data streaming (b) Data cleaning (c) Data mining (d) Data storming
33. Using data $p = 3$, $q = 11$, $n = pq$, $d = 7$ in RSA algorithm find the cipher text of the given plain text SUZANNE
 (a) BUTAE EZ (b) SUZANNE (c) XYZABCD (d) ABCDXYZ
34. The relation 'divides' on a set of positive integers is _____
 (a) Symmetric and transitive (b) Anti symmetric and transitive
 (c) Symmetric only (d) Transitive only
35. Give as good a big-O estimate as possible for the following functions:
 $(n \log n + n^2)(n^3 + 2)$ and $(n! + 2^n)(n^3 + \log(n^2 + 1))$
 (a) $O(n^5 + 2n^2)$ & $O(n^3 * n!)$ (b) $O(n^5)$ & $O(n^3 * 2^n)$
 (c) $O(n^5)$ & $O(n^3 * n!)$ (d) $O(n^5 + 2n^2)$ & $O(n^3 * 2^n)$
36. A test contains 100 true/false questions. How many different ways can a student answer the questions on the test, if the answer may be left blank also.
 (a) $^{100}P_2$ (b) $^{100}C_2$ (c) 2^{100} (d) 3^{100}
37. Which of the following connected simple graph has exactly one spanning tree?
 (a) Complete graph (b) Hamiltonian graph
 (c) Euler graph (d) None of the above.
38. How many edges must be removed to produce the spanning forest of a graph with N vertices, M edges and C connected components?
 (a) $M + N - C$ (b) $M - N - C$ (c) $M - N + C$ (d) $M + N + C$
39. Which of the following shall be a compound proposition involving the propositions p, q and r, that is true when exactly two of the q, p and r are true and one is false otherwise?
 (a) $(p \vee q \wedge \neg r) \vee (p \wedge q \wedge r) \wedge (\neg p \wedge q \vee r)$
 (b) $(p \wedge q \vee r) \wedge (p \wedge q \wedge r) \vee (\neg p \wedge \neg q \vee \neg r)$
 (c) $(p \wedge q \wedge \neg r) \wedge (p \wedge \neg q \wedge r) \vee (\neg p \wedge q \wedge r)$
 (d) $(p \vee q \wedge r) \vee (p \wedge q \wedge r) \vee (\neg p \wedge q \wedge r)$
40. The truth value of the statements:
 $\exists!xP(x) \rightarrow \exists xP(x)$ and $\exists!x\neg P(x) \rightarrow \neg \forall xP(x)$ (where the notation $\exists!xP(x)$ denotes the proposition. "There exists a unique x such that P(x) is true") are :
 (a) True and False (b) False and True (c) False and False (d) True and True
41. How many different Boolean functions of degree 4 are there?
 (a) 2^4 (b) 2^8 (c) 2^{12} (d) 2^{16}
42. A Boolean operator \ominus is defined as follows
 $1 \ominus 1 = 1$, $1 \ominus 0 = 0$, $0 \ominus 1 = 0$ and $0 \ominus 0 = 1$
 What will be the truth value of the expression $(x \ominus y) \ominus z = x \ominus (y \ominus z)$?
 (a) Always false (b) Always true (c) Sometimes true (d) True with x, y, z are all true.



43. Which one of the following is decimal value of a signed binary number 1101010, if it is in 2's complement form?
(a) -42 (b) -22 (c) -21 (d) -106
44. A set of processors P1, P2,, Pk can execute in parallel if Bernstein's conditions are satisfied on a pairwise basis; that is P1 || P2 || P3 || || Pk if and only if:
(a) $P_i || P_j$ for all $i \neq j$ (b) $P_i || P_j$ for all $i = j + 1$
(c) $P_i || P_j$ for all $i \leq j$ (d) $P_i || P_j$ for all $i \geq j$
45. When a mobile telephone physically moves from one to another cell, the base station transfers ownership to the cell getting strongest signal. This process is known as _____
(a) handoff (b) mobile switching (c) mobile routing (d) cell switching
46. A virtual memory based memory management algorithm partially swaps out a process. This is an example of
(a) Short term scheduling (b) Long term scheduling
(c) Medium term scheduling (d) Mutual exclusion
47. Assuming that the disk head is located initially at 32, find the number of disk moves required with FCFS if the disk queue of I/O block requests are 98, 37, 14, 124, 65, 67:
(a) 310 (b) 324 (c) 320 (d) 321
48. Let the page fault service time be 10 milliseconds(ms) in a computer with average memory access time being 20 nanoseconds(ns). If one page fault is generated for every 10^6 memory accesses, what is the effective access time for memory?
(a) 21 ns (b) 23 ns (c) 30 ns (d) 35 ns
49. Consider the following UNIX command:
sort <in> temp; head - 30 <temp; rm temp
Which of the following functions shall be performed by this command?
(a) Sort, taking the input from 'temp', prints 30 lines from temp and delete the file temp.
(b) Sort the file 'temp', removes 30 lines from temp and delete the file temp.
(c) Sort, taking the input from 'in' and writing the output to 'temp' then prints 30 lines from temp on terminal. Finally 'temp' is removed.
(d) Sort, taking the input from 'temp' and then prints 30 lines from 'temp' on terminal. Finally 'temp' is removed.
50. The mv command changes
(a) the inode (b) the inode-number.
(c) the directory entry (d) both the directory entry and the inode.

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UGC-NET COMPUTER SCIENCE & APPLICATIONS (87)

PAPER-III

Note: This paper contains **seventy five (75)** objective type questions of **two (2)** marks each. **All** questions are compulsory. The candidates are required to select the most appropriate answer of each question.

1. The Software Maturity Index (SMI) is defined as

$$SMI = [M_f - (F_a + F_c + F_d)]/M_f$$

where

M_f = the number of modules in the current release.

F_a = the number of modules in the current release that have been added.

F_c = the number of modules in the current release that have been changed.

F_d = the number of modules in the current release that have been deleted.

The product begins to stabilize when

- (a) SMI approaches 1
(b) SMI approaches 0
(c) SMI approaches -1
(d) None of the above.
2. Match the following
- | | |
|--------------------------------------|------------------------|
| (A) Watson-Felix model | (i) Failure intensity |
| (B) Quick-Fix model | (ii) Cost estimation |
| (C) Putnam resource allocation model | (iii) Project planning |
| (D) Logarithmic Poisson model | (iv) Maintenance |

Codes:

	A	B	C	D
(a)	ii	i	iv	iii
(b)	i	ii	iv	iii
(c)	ii	i	iii	iv
(d)	ii	iv	iii	i

3. _____ is a process model that removes defects before they can precipitate serious hazards

- (a) Incremental model
(b) Spiral model
(c) Clean room software engineering
(d) Agile model

4. Equivalence partitioning is a _____ method that divides the input domain of a program into classes of data from which test cases can be derived.

- (a) White-box testing
(b) Black-box testing
(c) Orthogonal array testing
(d) Stress testing

5. The following three golden rules

- (i) Place the user in control
(ii) Reduce the user's memory load
(iii) Make the interface consistent are for

- (a) User satisfaction
(b) Good interface design
(c) Saving system's resources
(d) None of these

6. Software safety is a _____ activity that focuses on the identification and assessment of potential hazards that may effect software negatively and cause an entire system to fail.

- (a) Risk mitigation, monitoring and management
(b) Software quality assurance
(c) Software cost estimation
(d) Defect removal efficiency



7. The 'PROJECT' operator of a relational algebra creates a new table that has always
- More columns than columns in original table
 - More rows than original table
 - Same number of rows as the original table.
 - Same number of columns as the original table.
8. The employee information of an Organization is stored in the relation:
Employee (name, sex, salary, deptname)
Consider the following SQL query.
Select deptname from Employee
Where sex = 'M'
group by deptname
having avg (salary) > {select avg (salary) from Employee}
Output of the given query corresponds to
- Average salary of employee more than average salary of the organization.
 - Average salary less than average salary of the organization
 - Average salary of employee equal to average salary of the organization.
 - Average salary of male employees in a department is more than average salary of the organization
9. For a database relation R(a, b, c, d) where the domains of a, b, c, d include only the atomic values.
The functional dependency $a \rightarrow c, b \rightarrow d$ holds in the following relation
- In 1NF not in 2NF
 - In 2NF not in 3NF
 - In 3NF
 - In 1NF
10. Match the following:
- | | |
|------------|------------------------------|
| (A) RAID 0 | (i) Bit interleaved parity |
| (B) RAID 1 | (ii) Non redundant stripping |
| (C) RAID 2 | (iii) Mirrored disks |
| (D) RAID 3 | (iv) Error correcting codes. |
- Codes:**
- | | A | B | C | D |
|-----|-----|----|----|-----|
| (a) | iv | i | ii | iii |
| (b) | iii | iv | i | ii |
| (c) | iii | i | iv | ii |
| (d) | iii | ii | iv | i |
11. The golden ratio ϕ and its conjugate $\bar{\phi}$ both satisfy the equation
- $x^3 - x - 1 = 0$
 - $x^3 + x - 1 = 0$
 - $x^2 - x - 1 = 0$
 - $x^2 + x - 1 = 0$
12. The solution of recurrence relation, $T(n) = 2T(\text{floor}(\sqrt{n})) + \log n$ is
- $O(n \log \log \log n)$
 - $O(n \log \log n)$
 - $O(\log \log n)$
 - $O(\log n \log \log n)$
13. In any n-element heap, the number of nodes of height h is
- less than equal to $\left\lceil \frac{n}{2^h} \right\rceil$
 - greater than $\left\lceil \frac{n}{2^h} \right\rceil$
 - greater than $\left\lceil \frac{n}{2^{h+1}} \right\rceil$
 - less than equal to $\left\lceil \frac{n}{2^{h+1}} \right\rceil$

14. A data file of 1, 00, 000 characters contains only the characters g-1, with the frequencies as indicated in table:

	g	h	i	j	k	l
Frquency in thousand	45	13	12	16	9	5

using the variable-length code by Huffman codes, the file can be encoded with
 (a) 2, 52, 000 bits (b) 2, 64, 000 bits (c) 2, 46, 000 bits (d) 2, 24, 000 bits

15. A vertex cover of an undirected graph $G(V, E)$ is a subset $V_1 \subseteq V$ vertices such that
 (a) Each pair of vertices in V_1 is connected by an edge.
 (b) If $(u, v) \in E$ then $u \in V_1$ and $v \in V_1$
 (c) If $(u, v) \in E$ then $u \in V_1$ or $v \in V_1$
 (d) All pairs of vertices in V_1 are not connected by an edge.
16. In a fully connected mesh network with n devices, there are _____ physical channels to link all devices.
 (a) $n(n-1)/2$ (b) $n(n+1)/2$ (c) $2n$ (d) $2n+1$
17. The baud rate of a signal is 600 baud/second. If each signal unit carries 6 bits, then the bit rate of a signal is _____
 (a) 3600 (b) 100 (c) 6/600 (d) None of the above.
18. Match the following:
 (A) Data link layer (i) Flow control
 (B) Network layer (ii) Node to node delivery
 (C) Transport layer (iii) Mail services
 (D) Application layer (iv) Routing
- Codes:**
- | | | | | |
|-----|----|----|-----|-----|
| | A | B | C | D |
| (a) | ii | i | iv | iii |
| (b) | ii | iv | i | iii |
| (c) | ii | i | iii | iv |
| (d) | ii | iv | iii | i |
19. An image is 1024×800 pixels with 3 bytes/pixel. Assume the image is uncompressed. How long does it take to transmit it over a 10-Mbps Ethernet?
 (a) 196.6 seconds (b) 19.66 seconds (c) 1.966 seconds (d) 0.1966 seconds
20. The _____ measures the relative strengths of two signals or a signal at two different points.
 (a) Frequency (b) Attenuation (c) Throughput (d) Decibel
21. Which one of the following media is multidrop?
 (a) Shielded Twisted pair cable (b) Unshielded Twisted pair cable
 (c) Thick Coaxial cable (d) Fiber Optic cable.
22. What is the baud rate of the standard 10 Mbps Ethernet?
 (a) 10 megabaud (b) 20 megabaud (c) 30 megabaud (d) 40 megabaud
23. At any iteration of simplex method, if $\Delta_j(Z_j - C_j)$ corresponding to any non-basic variable X_j is obtained as zero, the solution under the test is
 (a) Degenerate solution (b) Unbounded solution
 (c) Alternative solution (d) Optimal solution



24. A basic feasible solution to a m -origin, n -destination transportation problem is said to be _____ if the number of positive allocations are less than $m + n - 1$.
 (a) degenerate (b) non-degenerate (c) unbounded (d) unbalanced
25. The total transportation cost in an initial basic feasible solution to the following transportation problem using Vogel's Approximation method is

	W1	W2	W3	W4	W5	supply
F1	4	2	3	2	6	8
F2	5	4	5	2	1	12
F3	6	5	4	7	3	14
Demand	4	4	6	8	8	

- (a) 76 (b) 80 (c) 90 (d) 96
26. An actor in an animation is a small program invoked _____ per frame to determine the characteristics of some object in the animation.
 (a) once (b) twice (c) 30 times (d) 60 times
27. Bresenham line drawing algorithm is attractive because it uses
 (a) Real arithmetic only (b) Integer arithmetic only
 (c) Floating point arithmetic (d) Real and integer arithmetic
28. The refresh rate above which a picture stops flickering and fuses into a steady image is called _____
 (a) Crucial fusion frequency (b) Current frequency fusion
 (c) Critical fusion frequency (d) Critically diffused frequency
29. In homogenous coordinate system (x, y, z) the points with $z = 0$ are called
 (a) Cartesian points (b) Parallel points
 (c) Origin point (d) Point at infinity
30. If 40 black lines interleaved with 40 white lines can be distinguished across one inch, the resolution is
 (a) 40 line-pairs per inch (b) 80 line-pairs per inch
 (c) 1600 lines per inch (d) 40 lines per inch
31. Images tend to be very large collection of data. The size of memory required for a 1024 by 1024 image in which the colour of each pixel is represented by a n -bit number, (in an 8 bit machine) is
 (a) $n \times 8$ MB (b) $n/8$ MB
 (c) $(1024 \times 1024)/8$ MB (d) 1024 MB
32. Arrays in C language can have _____ with reference to memory representation
 (a) n -subscripts (b) two-subscripts (c) only one subscript (d) three subscripts only
33. Refer the points as listed below:
 (1) What are the operator precedence rules?
 (2) What are the operator associativity rules?
 (3) What is the order of operand evaluation?
 (4) Are there restrictions on operand evaluation side effects?
 Which of the above must be considered as primary design issues for arithmetic expressions?
 (a) 1, 2 and 3 (b) 1, 3 and 4 (c) 1, 2 and 4 (d) 1, 2, 3 and 4
34. Horn calculus are special kinds of propositions which can be described as
 (a) Single atomic proposition on left side. (b) Single or multiple atomic proposition on left side.
 (c) A single atomic proposition on left side and a single atomic proposition on right side.
 (d) A single atomic proposition on left side or an empty left side.
35. Which of the following is/are the fundamental semantic model(s) of parameter passing?
 (a) in mode (b) out mode (c) in-out mode (d) all of the above

36. The grammar with production rules $S \rightarrow aSb \mid SS \mid \lambda$ generates language L given by:
- (a) $L = \{w \in \{a, b\}^* \mid n_a(w) = n_b(w)\}$ and $n_a(v) \geq n_b(v)$ where v is any prefix of w
 - (b) $L = \{w \in \{a, b\}^* \mid n_a(w) = n_b(w) \text{ and } n_a(v) \leq n_b(v) \text{ where } v \text{ is prefix of } w\}$
 - (c) $L = \{w \in \{a, b\}^* \mid n_a(w) \neq n_b(w) \text{ and } n_a(v) \geq n_b(v) \text{ where } v \text{ is prefix of } w\}$
 - (d) $L = \{w \in \{a, b\}^* \mid n_a(w) \neq n_b(w) \text{ and } n_a(v) \leq n_b(v) \text{ where } v \text{ is prefix of } w\}$
37. A pushdown automation $M = (Q, \Sigma, \Gamma, \delta, q_0, z, F)$ is set to be deterministic subject to which of the following condition(s), for every $q \in Q, a \in \Sigma \cup \{\lambda\}$ and $b \in \Gamma$
- (s1) $\delta(q, a, b)$ contains at most one element
 - (s2) if $\delta(q, \lambda, b)$ is not empty then $\delta(q, c, b)$ must be empty for every $c \in \Sigma$
- (a) only s1 (b) only s2 (c) both s1 and s2 (d) neither s1 nor s2
38. For every context free grammar (G) there exists an algorithm that passes any $w \in L(G)$ in number of steps proportional to
- (a) $\ln|w|$ (b) $|w|$ (c) $|w|^2$ (d) $|w|^3$
39. Match the following:
- | | |
|--------------------------------|-------------------------------------|
| (A) Context sensitive language | (i) Deterministic finite automation |
| (B) Regular grammar | (ii) Recursive enumerable |
| (C) Context free grammar | (iii) Recursive language |
| (D) Unrestricted grammar | (iv) Pushdown automation |
- Codes.**
- | | A | B | C | D |
|-----|-----|----|----|-----|
| (a) | ii | i | iv | iii |
| (b) | iii | iv | i | ii |
| (c) | iii | i | iv | ii |
| (d) | ii | iv | i | iii |
40. The statements s1 and s2 are given as
s1: Context sensitive languages are closed under intersection, concatenation, substitution and inverse homomorphism.
s2: Context free languages are closed under complementation, substitution and homomorphism.
Which of the following is correct statement?
- (a) Both s1 and s2 are correct.
 - (b) s1 is correct and s2 is not correct
 - (c) s1 is not correct and s2 is correct
 - (d) both s1 and s2 are correct.
41. Which one of the following is not an addressing mode?
- (a) Register indirect
 - (b) Autoincrement
 - (c) Relative indexed
 - (d) Immediate operand
42. Computers can have instruction formates with
- (a) only two address and three address instructions
 - (b) only one address and two address instruction
 - (c) only one address, two address and three address
 - (d) zero address, one address, two address and three address instructions.



43. Which is not a typical program control instruction?
 (a) BR (b) JMP (c) SHL (d) TST
44. Interrupt which arises from illegal or erroneous use of an instruction or data is
 (a) Software interrupt (b) Internal interrupt
 (c) External interrupt (d) All of the above
45. The simplified function in product of sums of Boolean function $F(W, X, Y, Z) = \Sigma(0, 1, 2, 5, 8, 9, 10)$ is
 (a) $(W' + X')(Y' + Z')(X' + Z)$ (b) $(W' + X')(Y' + Z')(X + Z')$
 (c) $(W' + X')(Y' + Z)(X' + Z)$ (d) $(W' + X')(Y + Z')(X' + Z)$
46. Match the following
 (A) TTL (i) High component density
 (B) ECL (ii) Low power consumption
 (C) MOS (iii) Evolution of 'diode-transistor-logic'
 (D) CMOS (iv) High speed digital circuits.
Codes:
- | | A | B | C | D |
|-----|-----|----|-----|----|
| (a) | iii | ii | i | iv |
| (b) | i | iv | iii | ii |
| (c) | iii | iv | i | ii |
| (d) | i | ii | iii | iv |
47. Match the following
 (A) Foreign keys (i) Domain constraint
 (B) Private keys (ii) Referential integrity
 (C) Event control action model (iii) Encryption
 (D) Data security (iv) Trigger
Codes:
- | | A | B | C | D |
|-----|-----|----|-----|-----|
| (a) | iii | ii | i | iv |
| (b) | ii | i | iv | iii |
| (c) | iii | iv | i | ii |
| (d) | i | ii | iii | iv |
48. When an array is passed as a parameter to a function which of the following statements is correct?
 (a) The function can changes values in the original array.
 (b) The function cannot change values in the original array
 (c) Results in compilation error
 (d) Results in runtime error.
49. Suppose you want to delete the name that occurs before 'Vivek' in an alphabetical listing. Which of the following data structures shall be most efficient for this operation?
 (a) Circular linked list (b) Doubly linked list (c) Linked list (d) Dequeue
50. What will be the output of the following segment of the program?

```
main ( ) {
    char*s = "hello world";
    int i = 7;
    printf("%, *s", i, s); }
```

 (a) Syntax error (b) hello w (c) hello (d) o world

51. Trace the error:

```
void main ( ) {
    int *b, &a;
    *b = 20
    printf(“%d, %d”, a, *b) }
```

 (a) No error (b) Logical error (c) Syntax error (d) Semantic error.
52. Match the following:
 (A) calloc () (i) Frees previously allocated space
 (B) free () (ii) Modifies previously allocated space
 (C) malloc () (iii) Allocates space for array
 (D) realloc () (iv) Allocates requested size of space
- Codes:**
- | | A | B | C | D |
|-----|----------|----------|----------|----------|
| (a) | iii | i | iv | ii |
| (b) | iii | ii | i | iv |
| (c) | iii | iv | i | ii |
| (d) | iv | ii | iii | i |
53. Binary symmetric channel uses
 (a) Half duplex protocol (b) Full duplex protocol
 (c) Bit oriented protocol (d) None of the above
54. Hamming distance between 100101000110 and 110111101101 is
 (a) 3 (b) 4 (c) 5 (d) 6
55. Given code word 1110001010 is to be transmitted with even parity check bit. The encoded word to be transmitted for this code is
 (a) 11100010101 (b) 11100010100 (c) 1110001010 (d) 111000101
56. The number of distinct binary images which can generated from a given binary image of right $M \times N$ are
 (a) $M + N$ (b) $M \times N$ (c) 2^{M+N} (d) 2^{MN}
57. If $f(x, y)$ is a digital image, then x, y and amplitude values of f are
 (a) finite (b) infinite
 (c) neither finite nor infinite (d) none of the above.
58. Consider the following processor with time slice of 4 milliseconds (I/O requests are ignored):
- | Process | A | B | C | D |
|--------------|---|---|---|---|
| Arrival time | 0 | 1 | 2 | 3 |
| CPU cycle | 8 | 4 | 9 | 5 |
- The average turn around time of these processes will be
 (a) 19.25 milliseconds (b) 18.25 milliseconds
 (c) 19.5 milliseconds (d) 18.5 milliseconds
59. A job has four page A, B, C, D and the main memory has two page frames only. The job needs to process its pages in following order: ABACABDBACD
 Assuming that a page interrupt occurs when a new page is brought in the main memory, irrespective of whether the page is swapped out or not. The number of page interrupts in FIFO and LRU page replacement algorithms are
 (a) 9 and 7 (b) 7 and 6 (c) 9 and 8 (d) 8 and 6



60. Suppose S and Q are two semaphores initialized to 1. P1 and P2 are two processes which are sharing resources.

P1 has statements

wait(S);
wait(Q);
critical-section 1;
signal(S);
signal(Q);

P2 has statements

wait(Q);
wait(S);
critical-section 2;
signal(Q);
signal(S);

Their execution may sometimes lead to an undesirable situation called

- (a) Starvation (b) Race condition (c) Multithreading (d) Deadlock
61. An operating system using banker's algorithm for deadlock avoidance has ten dedicated devices (of same type) and has three processes P1, P2 and P3 with maximum resource requirements of 4, 5 and 8 respectively. There are two states of allocation of devices as follows:

State 1	Processes	P1	P2	P3
	Devices allocated	2	3	4

State 2	Processes	P1	P2	P3
	Devices allocated	0	2	4

Which of the following is correct?

- (a) State 1 is unsafe and state 2 is safe. (b) State 1 is safe and state 2 is unsafe.
(c) Both, state 1 and state 2 are safe (d) Both, state 1 and state 2 are unsafe.
62. Let the time taken to switch between user mode and kernel mode of execution be T1 while time taken to switch between two user processes be T2. Which of the following is correct?
(a) $T1 < T2$ (b) $T1 > T2$ (c) $T1 = T2$
(d) Nothing can be said about the relation between T1 and T2
63. Working set model is used in memory management to implement the concept of
(a) Swapping (b) Principal of locality (c) Segmentation (d) Thrashing
64. A UNIX file system has 1 KB block size and 4-byte disk addresses. What is the maximum file size if the inode contains ten direct block entries, one single indirect block entry, one double indirect block entry and one triple indirect block entry?
(a) 30 GB (b) 64 GB (c) 16 GB (d) 1 GB
65. A thread is usually defined as a light weight process because an Operating System (OS) maintains smaller data structure for a thread than for a process. In relation to this, which of the following statement is correct?
(a) OS maintains only scheduling and accounting information for each thread.
(b) OS maintains only CPU registers for each thread.
(c) OS does not maintain a separate stack for each thread.
(d) OS does not maintain virtual memory state for each thread
66. The versions of windows operating system like windows XP and windows Vista uses following file system:
(a) FAT-16 (b) FAT-32
(c) NTFS(NT File system) (d) All of the above.

67. Which one of the following is a correct implementation of the metapredicate “not” in PROLOG (here G represents a goal)?
- (a) not(G):- !, call(G), fail.
not(G).
 - (b) not(G):- call(G), !, fail.
not(G).
 - (c) not(G):- call(G), fail, !.
not(G).
 - (d) not(G), call(G), fail
not(G):-!

68. Which one of the following is not an informed search technique?
- (a) Hill climbing search
 - (b) Best first search
 - (c) A* search
 - (d) Depth first search

69. If we convert

$$\exists u \forall v \forall x \exists y (P(f(u), v, x, y) \rightarrow Q(u, v, y)) \text{ to } \forall v \forall x (P(f(a), v, x, g(v, x)) \rightarrow Q(a, v, g(v, x)))$$

This process is known as

- (a) Simplification
 - (b) Unification
 - (c) Skolemization
 - (d) Resolution
70. Given two jugs of capacities 5 litres and 3 litres with no measuring markers on them. Assume that there is endless supply of water. Then the minimum number of states to measure 4 litres water will be
- (a) 3
 - (b) 4
 - (c) 5
 - (d) 7
71. The map colouring problem can be solved using which of the following technique?
- (a) Means-end analysis
 - (b) Constraint satisfaction
 - (c) AO* search
 - (d) Breadth first search

72. Which of the following is a knowledge representation technique used to represent knowledge about stereotyped situation?
- (a) Semantic network
 - (b) Frames
 - (c) Scripts
 - (d) Conceptual Dependency

73. A fuzzy set A on R is ___ iff $A(\lambda x_1 + (1 - \lambda)x_2) \geq \min[A(x_1), A(x_2)]$

for all $x_1, x_2 \in R$ and all $\lambda \in [0, 1]$, where min denotes the minimum operator.

- (a) Support
- (b) α -cut
- (c) Convex
- (d) Concave

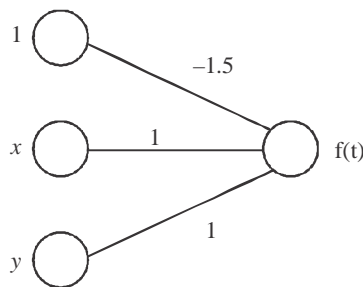
74. If A and B are two fuzzy sets with membership functions.

$$\mu_A(x) = \{0.6, 0.5, 0.1, 0.7, 0.8\} \quad \mu_B(x) = \{0.9, 0.2, 0.6, 0.8, 0.5\}$$

Then the value of $\mu_{A \cup B}(x)$ will be

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

75. Consider a single perception with weights as given in the following figure:



$$\text{and } f(t) \text{ defined as } f(t) = \begin{cases} 1, & t > 0 \\ 0, & t \leq 0 \end{cases}$$

The above perception can solve

- (a) OR problem
- (b) AND problem
- (c) XOR problem
- (d) All of the above.