

1. Consider the following pseudocode segment :

```

K:=0
for i1:= 1 to n
  for i2:= 1 to i1
    :
    :
    :
    for im:= 1 to 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) $C(n - m + 1, n)$
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
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

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

5. Suppose that a given application is run on a 64-processor 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

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

$$\mu_A(x) = \{0.2, 0.4, 0.8, 0.5, 0.1\}$$

$$\mu_B(x) = \{0.1, 0.3, 0.6, 0.3, 0.2\}$$

Then the value of $\mu_{\overline{A \cap B}}$ 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) $\{0.7, 0.3, 0.4, 0.2, 0.7\}$

7. Match the following :

- | | |
|---------------------|--------------------|
| (i) OLAP | (a) Regression |
| (ii) OLTP | (b) Data Warehouse |
| (iii) Decision Tree | (c) RDBMS |
| (iv) Neural Network | (d) Classification |

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

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
9. The problem that occurs when one transaction updates a database item and then the transaction fails for some reason is _____.
 (A) Temporary Select Problem
 (B) Temporary Modify Problem
 (C) Dirty Read Problem
 (D) None
10. In an image compression system 16384 bits are used to represent 256×256 image with 256 gray levels. What is the compression ratio for this system ?
 (A) 1 (B) 2
 (C) 4 (D) 8
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
12. Which of the following can be used for clustering of data ?
 (A) Single layer perception
 (B) Multilayer perception
 (C) Self organizing map
 (D) Radial basis function
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

14. If the pixels of an image are shuffled then the parameter that may change is
 (A) Histogram (B) Mean
 (C) Entropy (D) Covariance
15. The common property of functional language and logical programming language :
 (A) Both are declarative
 (B) Both are based on λ -calculus
 (C) Both are procedural
 (D) Both are functional
16. Given the following statements :
 (i) The power of deterministic finite state machine and non-deterministic finite state machine are same.
 (ii) The power of deterministic pushdown automaton and non-deterministic pushdown automaton are same.
 Which of the above is the correct statement(s) ?
 (A) Both (i) and (ii)
 (B) Only (i)
 (C) Only (ii)
 (D) Neither (i) nor (ii)
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) $\forall x \exists y Q(x, y)$
 where x & y are real numbers. Then which of the following is valid ?
 (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.

18. Consider a schema $R(A, B, C, D)$ and functional dependencies $A \rightarrow B$ and $C \rightarrow D$. Then the decomposition $R_1(A, B)$ and $R_2(C, D)$ is
- Dependency preserving but not lossless join
 - Dependency preserving and lossless join
 - Lossless Join but not dependency preserving
 - Lossless Join
19. The quantiser in an image-compression system is a
- lossy element which exploits the psychovisual redundancy
 - lossless element which exploits the psychovisual redundancy
 - lossy element which exploits the statistical redundancy
 - lossless element which exploits the statistical redundancy
20. Data Warehouse provides
- Transaction Responsiveness
 - Storage, Functionality Responsiveness to queries
 - Demand and Supply Responsiveness
 - None of the above
21. A* algorithm uses $f' = g + h'$ 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
- $g = 1$ (B) $g = 0$
 - $h' = 0$ (D) $h' = 1$
22. The transform which possesses the highest 'energy compaction' property is
- Slant transform
 - Cosine transform
 - Fourier transform
 - Karhunen-Loeve transform
23. Which one of the following prolog programs correctly implement "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).
 - if-else (G, P, θ) :- call(G), !, call(P).
if-else (G, P, θ) :- call(θ).
 - if-else (G, P, θ) :- call(G), call(P), !.
if-else (G, P, θ) :- call(θ).
 - All of the above
24. The _____ memory allocation function modifies the previous allocated space.
- calloc() (B) free()
 - malloc() (D) realloc()
25. Which is not the correct statement(s) ?
- Every context sensitive language is recursive.
 - There is a recursive language that is not context sensitive.
- (i) is true, (ii) is false.
 - (i) is true and (ii) is true.
 - (i) is false, (ii) is false.
 - (i) is false and (ii) is true.
26. The mechanism that binds code and data together and keeps them secure from outside world is known as
- Abstraction
 - Inheritance
 - Encapsulation
 - Polymorphism

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
- (A) $a - 1, b - 2, c - 3, d - 4$
 (B) $a - 2, b - 1, c - 4, d - 3$
 (C) $a - 3, b - 2, c - 1, d - 4$
 (D) $a - 4, b - 3, c - 2, d - 1$
28. Which one of the following is not a Greibach Normal form grammar ?
- (i) $S \rightarrow a \mid bA \mid aA \mid bB$
 $A \rightarrow a$
 $B \rightarrow b$
- (ii) $S \rightarrow a \mid aA \mid AB$
 $A \rightarrow a$
 $B \rightarrow b$
- (iii) $S \rightarrow a \mid A \mid aA$
 $A \rightarrow a$
- (A) (i) and (ii)
 (B) (i) and (iii)
 (C) (ii) and (iii)
 (D) (i), (ii) and (iii)
29. Which of the following IP address class is a multicast address ?
- (A) Class A (B) Class B
 (C) Class C (D) Class D
30. While unit testing a module, it is found that for a set of test data, maximum 90% of the code alone were tested with a probability of success 0.9. The reliability of the module is
- (A) atleast greater than 0.9
 (B) equal to 0.9
 (C) atmost 0.81
 (D) atleast 1/0.81
31. The upper bound of computing time of m coloring decision problem is
- (A) $O(nm)$ (B) $O(n^m)$
 (C) $O(nm^n)$ (D) $O(n^m m^n)$
32. The equivalent grammar corresponding to the grammar $G : S \rightarrow aA, A \rightarrow BB, B \rightarrow aBb \mid \epsilon$ is
- (A) $S \rightarrow aA, A \rightarrow BB, B \rightarrow aBb$
 (B) $S \rightarrow alaA, A \rightarrow BB, B \rightarrow aBb \mid ab$
 (C) $S \rightarrow a \mid aA, A \rightarrow BB \mid B, B \rightarrow aBb$
 (D) $S \rightarrow a \mid aA, A \rightarrow BB \mid B, B \rightarrow aBb \mid ab$
33. Which one of the following statements is incorrect ?
- (A) The number of regions corresponds to the cyclomatic complexity.
 (B) Cyclometric complexity for a flow graph G is $V(G) = N - E + 2$, where E is the number of edges and N is the number of nodes in the flow graph.
 (C) Cyclometric complexity for a flow graph G is $V(G) = E - N + 2$, where E is the number of edges & N is the number of nodes in the flow graph.
 (D) Cyclometric complexity for a flow graph G is $V(G) = P + 1$, where P is the number of predicate nodes contained in the flow graph G.
34. Consider a weighted undirected graph with positive edge weights and let (u, v) be an edge in the graph. It is known that the shortest path from source vertex s to u has weight 53 and shortest path from s to v has weight 65. Which statement is always true ?
- (A) $\text{Weight}(u, v) \leq 12$
 (B) $\text{Weight}(u, v) = 12$
 (C) $\text{Weight}(u, v) \geq 12$
 (D) $\text{Weight}(u, v) > 12$
35. Consider the regular expression $(a + b)(a + b) \dots (a + b)$ (n-times). The minimum number of states in finite automaton that recognizes the language represented by this regular expression contains
- (A) n states (B) $n + 1$ states
 (C) $n + 2$ states (D) 2^n states

36. Number of binary trees formed with 5 nodes are
 (A) 32 (B) 36
 (C) 120 (D) 42

37. Are we building the right product ?
 This statement refers to
 (A) Verification
 (B) Validation
 (C) Testing
 (D) Software quality assurance

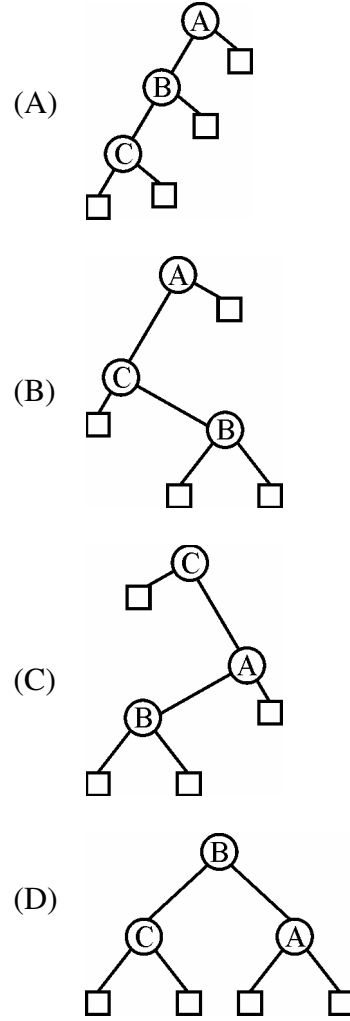
38. The following postfix expression is evaluated using a stack
 $823^{\wedge}/23^* + 51^* -$
 The top two elements of the stack after first * is evaluated
 (A) 6, 1 (B) 5, 7
 (C) 3, 2 (D) 1, 5

39. The following CFG
 $S \rightarrow aB \mid bA, A \rightarrow a \mid as \mid bAA,$
 $B \rightarrow b \mid bs \mid aBB$
 generates strings of terminals that have
 (A) odd number of a's and odd number of b's
 (B) even number of a's and even number of b's
 (C) equal number of a's and b's
 (D) not equal number of a's and b's

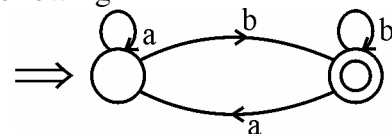
40. Consider the following pseudo-code :
 If (A > B) and (C > D) then
 A = A + 1
 B = B + 1
 Endif
 The cyclomatic complexity of the pseudo-code is
 (A) 2 (B) 3
 (C) 4 (D) 5

41. Which layer of OSI reference model uses the ICMP (Internet Control Message Protocol) ?
 (A) Transport layer
 (B) Data link layer
 (C) Network layer
 (D) Application layer

42. Which one of the following binary search tree is optimal, if probabilities of successful search and unsuccessful search are same ?



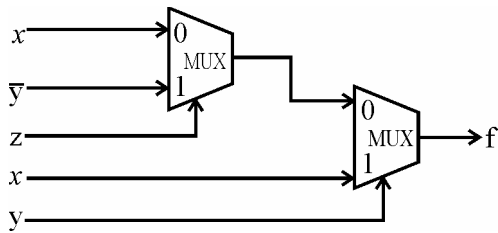
43. The regular expression for the following DFA



- is
 (A) $ab^*(b + aa^*b)^*$
 (B) $a^*b(b + aa^*b)^*$
 (C) $a^*b(b^* + aa^*b)$
 (D) $a^*b(b^* + aa^*b)^*$

44. Which diagram provides a formal graphic notation for modelling objects, classes and their relationships to one another ?
 (A) Object diagram
 (B) Class diagram
 (C) Instance diagram
 (D) Analysis diagram
45. A computer system supports 32 bit virtual address as well as 32 bit physical addresses. Since the virtual address space is of same size as that of physical address space, if we want to get rid of virtual memory, which one of the following is true ?
 (A) Efficient implementation of multiuser support is no longer possible.
 (B) The processor cache can be made more efficient.
 (C) Hardware support for memory management is not needed.
 (D) CPU scheduling can be made more efficient.
46. The feasible region represented by the constraints $x_1 - x_2 \leq 1$, $x_1 + x_2 \geq 3$, $x_1 \geq 0$, $x_2 \geq 0$ of the objective function $\text{Max } Z = 3x_1 + 2x_2$ is
 (A) A polygon
 (B) Unbounded feasible region
 (C) A point
 (D) None of these
47. The colour of an object is largely determined by its diffuse reflection coefficient. If $K_d = (0.8, 0.4, 0)$, then what shall be the colour of the object, if the light used is blue and magenta ?
 (A) White and Red
 (B) Red and Blue
 (C) Black and White
 (D) Black and Red
48. If an instruction takes 'i' microseconds and a page fault takes an additional 'j' microseconds. The effective instruction time, if on the average a page fault occurs every k instructions, is
 (A) $i + j/k$ (B) $i + j * k$
 (C) $(i + j)/k$ (D) $(i + j) * k$
49. In any simplex table, if corresponding to any negative Δ_j , all elements of the column are negative or zero, the solution under the test is
 (A) degenerate solution
 (B) unbounded solution
 (C) alternative solution
 (D) non-existing solution
50. How many relations are there on a set with n elements that are symmetric and a set with n elements that are reflexive and symmetric ?
 (A) $2^{n(n+1)/2}$ and $2^n \cdot 3^{n(n-1)/2}$
 (B) $3^{n(n-1)/2}$ and $2^{n(n-1)}$
 (C) $2^{n(n+1)/2}$ and $3^{n(n-1)/2}$
 (D) $2^{n(n+1)/2}$ and $2^{n(n-1)/2}$
51. The strategy used to reduce the number of tree branches and the number of static evaluations applied in case of a game tree is
 (A) Minmax strategy
 (B) Alpha-beta pruning strategy
 (C) Constraint satisfaction strategy
 (D) Static max strategy
52. Match the following :
 (i) Regular Grammar (a) Pushdown automaton
 (ii) Context free Grammar (b) Linear bounded automaton
 (iii) Unrestricted Grammar (c) Deterministic finite automaton
 (iv) Context Sensitive Grammar (d) Turing machine
- (i) (ii) (iii) (iv)
 (A) (c) (a) (b) (d)
 (B) (c) (a) (d) (b)
 (C) (c) (b) (a) (d)
 (D) (c) (b) (d) (a)

53. Consider the below circuit and find the output function $f(x, y, z)$.



- (A) $x\bar{z} + xy + \bar{y}z$
 (B) $x\bar{z} + xy + \bar{y}\bar{z}$
 (C) $xz + xy + \bar{y}\bar{z}$
 (D) $xz + x\bar{y} + \bar{y}z$
54. What is the size (in terms of bits) of Header length field in IPV4 header ?
 (A) 2 (B) 4
 (C) 8 (D) 16

55. Match the following with respect to java.util.* class methods :

- (a) Bit Set (i) Time zone
 getTImezone()
 (b) Calendar (ii) int hashCode()
 (c) Time zone (iii) int nextInt()
 (d) Random (iv) Void setID(String
 tzName)

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

56. _____ is sometimes said to be object oriented, because the only way to manipulate kernel objects is by invoking methods on their handles.

- (A) Windows NT
 (B) Windows XP
 (C) Windows VISTA
 (D) Windows 95/98

57. A user level process in Unix traps the signal sent on a Ctrl + C input and has a signal handling routine that saves appropriate files before terminating the process. When a Ctrl + C input is given to this process, what is the mode in which the signal handling routine executes ?

- (A) User mode
 (B) Kernel mode
 (C) Superuser mode
 (D) Privileged mode

58. A CPU generally handles an interrupt by executing an interrupt service routine

- (A) as soon as an interrupt is raised
 (B) by checking the interrupt register at the end of fetch cycle
 (C) by checking the interrupt register after finishing the executing the current instruction
 (D) by checking the interrupt register at fixed time intervals

59. The perspective projection matrix, on the view plane $z = d$ where the centre of projection is the origin (0, 0, 0) shall be

- (A)
$$\begin{bmatrix} 0 & 0 & 0 & d \\ 0 & 0 & d & 0 \\ 0 & d & 0 & 0 \\ d & 0 & 0 & 1 \end{bmatrix}$$
- (B)
$$\begin{bmatrix} d & 0 & 0 & 0 \\ d & 0 & 0 & 0 \\ 0 & d & 0 & 0 \\ 0 & 0 & d & 0 \end{bmatrix}$$
- (C)
$$\begin{bmatrix} 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & d \\ 0 & 0 & d & 0 \\ 0 & d & 0 & 0 \end{bmatrix}$$
- (D)
$$\begin{bmatrix} 1 & 0 & 0 & 0 \\ d & 0 & 0 & 0 \\ 0 & d & 0 & 0 \\ 0 & 0 & d & 0 \end{bmatrix}$$

60. Radio signals generally propagate according to the following mechanisms:

- (A) Modulation, Amplification, Scattering
- (B) Reflection, Diffraction, Scattering
- (C) Amplification, Diffraction, Modulation
- (D) Reflection, Amplification, Diffraction

61. Identify the devices given below with their IC numbers :

- (i) USART (a) 8251
- (ii) Micro controller (b) 8051
- (iii) Interrupt controller (c) 8259
- (iv) DMA controller (d) 8257

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

62. The optimal solution of the following assignment problem using Hungarian method is

	I	II	III	IV
A	8	26	17	11
B	13	28	4	26
C	38	19	18	15
D	19	26	24	10

- (A) (I) (II) (III) (IV)
- (B) (I) (III) (II) (IV)
- (C) (I) (III) (IV) (II)
- (D) (I) (IV) (II) (III)

63. If a and b are the end points of a line, then which one of the following is true ?

- (A) If both end points are left, right, above or below the window, the line is invisible.
- (B) If both end points are left, right, above or below the window, the line is completely visible.
- (C) If both end points are left, right, above or below the window, the line is trivially visible.
- (D) If both end points are left, right, above or below the window, the line is trivially invisible.

64. Match the following with link quality measurement and handoff initiation :

- (a) Networked- Controlled Handoff (NCHO)
- (b) Mobile-Assisted Handoff (MAHO)
- (c) Forward Handoff
- (d) Hard Handoff
- (i) MS connect to BS
- (ii) Process via channel the target BS
- (iii) First Generation Analog Cellular System
- (iv) Second Generation Digital Cellular System

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

65. Consider the methods used by processes P_1 and P_2 for accessing their critical sections. The initial values of shared Boolean variables S_1 and S_2 are randomly assigned,

P_1	P_2
while ($S_1 = S_2$);	while ($S_1 = S_2$);
critical section	critical section
$S_1 = S_2$;	$S_1 = S_2$;

Which one of the following statements describes the properties achieved ?

- (A) Mutual exclusion but not progress
 (B) Progress but not mutual exclusion
 (C) Neither mutual exclusion nor progress
 (D) Both mutual exclusion and progress
66. If the period of a signal is 1000 ms, then what is its frequency in kilohertz ?
 (A) 10^{-3} KHz (B) 10^{-2} KHz
 (C) 10^{-1} KHz (D) 1 KHz
67. Let $a * H$ and $b * H$ be two cosets of H .

- (i) Either $a * H$ and $b * H$ are disjoint
 (ii) $a * H$ and $b * H$ are identical

Then,

- (A) only (i) is true
 (B) only (ii) is true
 (C) (i) or (ii) is true
 (D) (i) and (ii) is false

68. HTML is defined using SGML – an _____ standard, information processing-text and office systems (SGML) for text information processing.

- (A) ISO – 8878
 (B) ISO – 8879
 (C) ISO – 8880
 (D) ISO – 8881

69. What is the meaning of 'Hibernate' in Windows XP/Windows 7 ?

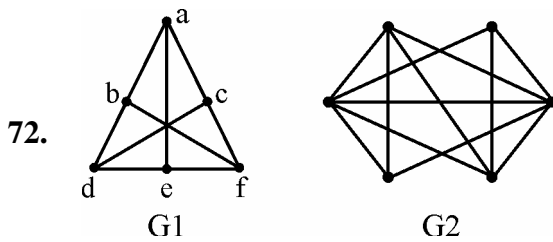
- (A) Restart the computers in safe mode.
 (B) Restart the computers in normal mode.
 (C) Shutdown the computer terminating all the running applications.
 (D) Shutdown the computer without closing the running applications.

70. Assume that we have constructor functions for both base class and derived class. Now consider the declaration in main(). $\text{Base} * P = \text{New Derived}$; in what sequence will the constructor be called ?

- (A) Derived class constructor followed by Base class constructor.
 (B) Base class constructor followed by derived class constructor.
 (C) Base class constructor will not be called.
 (D) Derived class constructor will not be called.

71. Which one of the following options is not a shell in UNIX system ?

- (A) Bourne Shell
- (B) C Shell
- (C) Net Shell
- (D) Korn Shell



G1 and G2 are two graphs as shown :

- (A) Both G1 and G2 are planar graphs.
- (B) Both G1 and G2 are not planar graphs.
- (C) G1 is planar and G2 is not planar graph.
- (D) G1 is not planar and G2 is planar graph.

73. In which file the compiler manage the various objects, which are used in windows programming ?

- (A) Control File
- (B) Binary File
- (C) Text File
- (D) Obj File

74. On a disk with 1000 cylinders (0 to 999) find the number of tracks, the disk arm must move to satisfy all the requests in the disk queue. Assume the last request service was at track 345 and the head is moving toward track 0. The queue in FIFO order contains requests for the following tracks :

123, 874, 692, 475, 105, 376

(Assume SCAN algorithm)

- (A) 2013
- (B) 1219
- (C) 1967
- (D) 1507

75. Halftoning is defined as

- (A) a technique to obtain increased visual resolution using multiple intensity levels.
- (B) a technique for using minimum number of intensity levels to obtain increased visual resolution.
- (C) a technique to obtain increased visual resolution using maximum number of intensity levels.
- (D) a technique for using appropriate number intensity levels to obtain increased visual resolution.

