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# Computer Science and Applications Paper II

## Time Allowed : 120 Minutes]

[Maximum Marks : 200

Note : This paper contains Hundred (100) multiple choice questions. Each question carrying Two (2) marks. Attempt All questions.

1. L o (2	Let $\phi$ , $\psi$ be the formula, $\phi \models \Psi$ , if and		Five people stand at the vertices of		
	only if $\phi \models \Psi$ is a :		a pentagon, throwing frisbees to each other. They have two frisbees		
	(A) Tautology		initially at adjacent vertices as shown in the figure. In each time		
	(B) Contradiction		interval, each frisbee is thrown either to the left or to the right (along		
	(C) Contingency		an edge of the pentagon) with equal probability. This process continues		
	(D) Either tautology or contradiction		until one person is the target of two		
	or contingency		ends.		
2.	Which of the following relations		(Note : All throws are independent of past history)		
	defined on $X = \{1, 2, 3\}$ is an		$\wedge$		
	equivalent relation ?				
	(A) $\{(1, 2), (2, 2), (3, 3)\}$				
	$(B) \ \{(1, 1), (2, 2), (2, 2), (2, 1), (3, 3),$				
	(1, 1)}		Find the mean and variance of the		
	(C) $\{(1, 1), (1, 2), (1, 3), (2, 2), (2, 1)\}$		number of pairs of throws.		
	(0, 0)  ((1, 1), (1, 2), (1, 0), (2, 2), (2, 1), (2, 2), (2, 1))		(A) 12 and 100		
	(3, 3), (3, 1)		(B) 6 and 50		
	(D) All of the above		(C) 24 and 200		
			(D) 18 and 80		





- A rod is divided into six segment is to be colored with one or more of 4 different colors. In how many ways can this be done ?
  - (A) 160
  - (B) 146
  - (C) 150
  - (D) 133
- 5. A committee is to be selected from
  5 candidates a, b, c, d and e. The selection must satisfy all the following conditions :
  - Either *a* or *b* must be included, but not both
  - Either c or e or both must be included
  - If d is included then b must be included
  - Either *a* or *c* are included or neither is included.
  - If e is included, then c and d must be included. How should selection be made ?
  - (A)  $a \wedge \overline{b} \wedge c \wedge \overline{d} \wedge \overline{e}$ (B)  $\overline{a} \wedge \overline{b} \wedge c \wedge \overline{d} \wedge \overline{e}$ (C)  $\overline{a} \wedge \overline{b} \wedge c \wedge \overline{d} \wedge e$ (D)  $\overline{a} \wedge \overline{b} \wedge c \wedge d \wedge \overline{e}$

- 6. The thickness of a graph G is defined as minimum number of (edgedisjoint) planar subgraphs into which G can be decomposed. The thickness of G is defined as θ(G). What is the thickness of planar graph ?
  - (A) 1
  - (B) 2
  - (C) 3
  - (D) 4
- 7. Let us consider the letters from a through h, and all 5 letters are made using these letters. (words are just strings of letters). How many of these words contain no repeated letters ?
  - (A) 6720
  - (B) 6072
  - (C) 7260
  - (D) 7630





8. What is the smallest number of colors that can be used to color the vertices of a cube so that no 2 adjacent vertices are colored identically ?



- (A) 2 colors
- (B) 1 color
- (C) 3 colors
- $(D) \ 4 \ colors$
- 9. Let us consider the following primal problem :

Maximize  $z = 2x_1 + x_2$ 

Subject to  $x_1 - x_2 \le 4$ ,  $x_1 - x_2 \le 2$ ,  $x_1, x_2 \ge 0$ 

What will be its dual problem ?

- (A) Dual feasible
- (B) Dual infeasible
- (C) Dual feasible and unbounded
- (D) Dual unbounded

10. Consider the following linear programming problem :

Maximize 
$$z = 5x_1 + 2x_2 + 3x_3 - x_4 + x_5$$

Subject to :  $x_1 + 2x_2 + 2x_3 + x_4 = 8$ 

$$3x_1 + 4x_2 + x_3 + x_5 = 7$$

$$x_1, x_2, x_3, x_4, x_5 \ge 0$$

What will be the basic feasible solution after iteration 1 ?

- (A)  $x_1 = 0, x_2 = 0, x_3 = 4, x_4 = 0,$  $x_5 = 3, z = 15$
- (B)  $x_1 = 1, x_2 = 2, x_3 = 1, x_4 = 0,$  $x_5 = 0, z = 12$
- (C)  $x_1 = 0, x_2 = 5, x_3 = 0, x_4 = 1,$  $x_5 = 0, z = 10$
- (D) There is no feasible solution for

this problem





11. Given Truth Table represents which of the following Logic Gate ?

Input		Output	
Α	В	Q	
0	0	1	
0	1	1	
1	0	1	
1	1	0	



- (C)  $\stackrel{A}{B} \longrightarrow Q$



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- 12. "100" is a number in Octal Number System. What will be its representation in Hexadecimal Number System ?
  - (A) 40
  - (B) 64
  - (C) 100
  - (D) 256
- 13. What is the interpretation of "R1  $\leftarrow$  R2" instruction in Register Transfer Language ?
  - (A) Load the content of R2 into R1  $\,$
  - (B) Add the content of R2 into R1
  - (C) Load the content of R2 into R1 and then delete the contents of R2
  - (D) Add the content of R2 into R1 and then delete the contents of R2



- 14. The "instruction decode" phase in CPU's instruction cycle is responsible to ......
  - (A) load the instruction into CPU
  - (B) translate the instruction into machine language code
  - (C) determine the opcode and operands of the instruction
  - (D) execute the operation specifiedby the instruction
- 15. What is the objective of Assembly Level Language in a computer system ?
  - (A) to provide a natural language environment for the programmer
  - (B) to provide a high-level abstractionof hardware for the programmer
  - (C) to enable direct execution of code by the computer system
  - (D) to enable execution of code on different computer system platforms

16. Identify an appropriate operation sequence with respect to execution of a machine level language instruction.

- (A) Load instruction address-get the instruction-execute the opcode-get effective address of operands
- (B) Load instruction address-get effective address of operandsget the instruction-execute the opcode
- (C) Load instruction address-get the instruction-get effective address of operands-execute the opcode
- (D) Load instruction address-get effective address of operandsexecute the opcode-get the instruction





- 17. Which of the following statements is true with respect to RISC architecture in comparison with CISC architecture ?
  - (A) Instruction set consists of more instructions
  - (B) Instructions involve more addressing modes
  - (C) Instructions are generally of fixed length
  - (D) Instruction set consists of complex instructions
- 18. Which of the following computer system is represented when many processing units are working under the supervision of a common control unit ?
  - (A) Single Instruction Stream,Single Data Stream (SISD)
  - (B) Single Instruction Stream, Multiple Data Stream (SIMD)
  - (C) Multiple Instruction Stream, Single Data Stream (MISD)
  - (D) Multiple Instruction Stream, Multiple Data Stream (MIMD)

19. Which of the following generally does not use a Software Interrupt ?

- (A) Software Timer
- (B) System Timer
- (C) Page Fault
- (D) Task Switching
- 20. Which type of memory generally enables to enhance the performance of a CPU ?
  - (A) Auxiliary Memory
  - (B) Associative Memory
  - (C) Cache Memory
  - (D) Virtual Memory
- 21. In which programming paradigm the desired result is declared as the value of a series of function applications ?
  - (A) Procedural
  - (B) Object oriented
  - (C) Logical
  - (D) Functional





- 22. Which of the following scenario necessitates file locking to be enabled by an Integrated Development Environment (IDE) ?
  - (A) To ensure the privacy of a source code file
  - (B) To prevent un-authorized access to a source code file
  - (C) To prevent concurrent access to a source code file
  - (D) To enable proper versioning of a source code file
- 23. How much memory will be allocated for the instances of structure S (with respect to C language) ?

typedef struct {

- char a; int b;
- } S;
- (A) size required to store a character
- (B) size required to store an integer
- (C) size required to store a character and an integer
- (D) allocated memory size will depend upon the available memory

24. int main() {

```
int x
x = (1 + 2;
return x;
```

}

Which of the following statements is true with respect to this source code in C language ?

- (A) Syntax Error
- (B) Semantic Error
- (C) Linking Error
- (D) Runtime Error
- 25. Which of the following term describes the ability of a class to provide common interface for different types of objects in objectoriented programming ?
  - (A) Encapsulation
  - (B) Polymorphism
  - (C) Inheritance
  - (D) Abstraction





- 26. By default, C++ language provides ......
  - (A) early binding for variables and late binding for functions
  - (B) late binding for variables and early binding for functions
  - (C) early binding for variables and early binding for functions
  - (D) late binding for variables and late binding for functions
- 27. Which of the following options appropriately describes the term DHTML ?
  - (A) HTML supported by specific browsers
  - (B) Combination of HTML and stylesheets
  - (C) Combination of HTML and client-side scripts
  - (D) Combination of HTML, stylesheets and client-side scripts

- 28. JavaScript language can be used ......
  - (A) only for client-side programming in web applications
  - (B) only for server-side programming in web applications
  - (C) for client-side as well as serverside programming in web applications
  - (D) only to create desktop applications
- 29. Assume that a line is drawn using DDA line drawing algorithm and the points  $p_1$ ,  $p_2$ ,  $p_3$ , ....,  $p_n$  are generated in the sequence with  $p_1(5, 15)$  as the first point and  $p_n(15, 25)$  as last point of the line. What is the location of the third point  $p_3$  ?
  - (A) (6, 11)
  - (B) (7, 11)
  - (C) (6, 12)
  - (D) (7, 12)





- 30. The binary region code assigned to the line end point located at the bottom-right side of the clipping rectangle in the Cohen-Sutherland line clipping algorithm is ............
  - (A) 0110
  - (B) 1010
  - (C) 0101
  - (D) 1001
- 31. Among the following, which is foreign key constraint ?
  - (A) Domain integrity
  - (B) Entity integrity
  - (C) Referential integrity
  - (D) Key integrity
- 32. In the ..... normal form, a composite attribute is converted to individual attributes. Which of the following represents a query in the tuple relational calculus ?
  - $(A) \ \{P(t) \, | \, t\}$
  - (B)  $\{P() | t\}$
  - (C)  $\{t \mid P()\}$
  - (D)  $\{t \mid P(t)\}$

- - (A) Primary key
  - (B) Foreign key
  - (C) Super key
  - (D) Candidate key
- 34. The future trends and behaviors (For business managers to make proactive knowledge-driven decisions) can be predicted by :
  - (A) Meta data
  - (B) Data warehouse
  - (C) Data mining
  - (D) Relational data
- 35. Which NoSQL database is known for its ability to handle complex queries and data analysis ?
  - (A) Dbase
  - (B) HBase
  - (C) Couchbase
  - (D) MongoDB





- 36. Let R = (M N O P Q) be a relational scheme with functional dependency  $F = \{M \rightarrow N, N \rightarrow O, MO \rightarrow P\}$ Then closures of Q and M are : (A)  $\Phi$ , MNOP
  - (B) Φ, Φ
  - (C) Q, MNOP
  - (D) Q, MNO
- 37. The ..... file organization provides very fast access to any arbitrary record of a file.
  - (A) B-tree
  - (B) Sequential
  - (C) Ordered
  - (D) Hashed
- 38. Select the *correct* option :
  - (A) The height of a B<sup>+</sup>-tree is independent of the number of records
  - (B) B-trees are used in primary indexes and B<sup>+</sup>-trees are used in secondary indexes
  - (C) Range queries are faster on  $B^+$ -tree
  - (D) B<sup>+</sup>-trees are used for storing data in main memory and B-trees are used for storing data on disk

39. An ER model of a database consists of entity types P and Q. These are connected by a relationship R, which does not have its own attributes (i.e., no self attributes).

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Under which one of the following condition, can the relational table for R be merged with that of P ?

- (A) Relationship R is one-to-many and the participation of P in R is total
- (B) Relationship R is one-to-many and the participation of P in R is partial
- (C) Relationship R is many-to-one and the participation of P in R is total
- (D) Relationship R is many-to-one and the participation of P in R is partial





- 40. A data dictionary system is called a ..... if it is used only by designers, users, and administrators and not by the DBMS software.
  - (A) passive data dictionary
  - (B) static data dictionary
  - (C) active data dictionary
  - (D) dynamic data dictionary
- 41. Network operating system runs
  on ......
  - (A) every system in the network
  - (B) server
  - (C) both server and every system in the network
  - (D) Neither server nor every system

### in the network

# 42. A sender 'S' sends a message 'M' to receiver 'R', which is digitally signed by 'S' with its private key. In this scenario, one or more of the following security violations can take place.

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- 'S' can launch a birthday attack to replace M with a fraudulent message.
- (2) A third party attacker can launch a birthday attack to replace 'M' with a fraudulent message.
- (3) 'R' can launch a birthday attack to replace 'M' with a fraudulent message.

Which of the following are possible security violations ?

- (A) (1) and (2) only
- (B) (1) only
- (C) (2) only
- (D) (2) and (3) only





- 43. A CPU generates 32-bit virtual addresses. The page size in 4KB. The processor has a translation lookaside Buffer (TLB) which can hold a total of 128 pages table entries and is 4-way set associative. The maximum size of the TLB tag is :
  - (A) 11 bits
  - (B) 13 bits
  - (C) 15 bits
  - (D) 20 bits
- 44. With regard to linked list, which of the statement is FALSE ?
  - (A) An algorithm to search for an element in a singly linked list requires O(n) operations in the worst case
  - (B) An algorithm for deleting the first element in a singly linked list requires O(n) operations in the worst case.
  - (C) An algorithm for finding the maximum value in a circular linked list requires O(n) operations
  - (D) An algorithm for deleting the middle node of a circular linked list requires O(n) operations

- 45. Consider a disk that has 150 cylinders, numbered from 0 to 149. Currently the disk arm is at 80 and moving towards higher cylinders. The disk access requests for cylinders are 30, 78, 96, 123, 141, 15, 13, 68. What will be the absolute difference traversed by R/W head when CSCAN and clock is used ?
  - (A) 135
  - (B) 42
  - (C) 38
  - (D) 21
- 46. Consider a system with 'M' CPU processors and 'N' processes then how many processes can be present in ready, running and blocked state at maximum ?
  - (A) N, M, N
  - (B) N, M, M
  - (C) M, N, M
  - (D) N, N+M, M





- 47. Binary search tree is an example of :
  - (A) Divide and conquer technique
  - (B) Greedy Algorithm
  - (C) Back tracking
  - (D) Dynamic programming
- 48. Which of the below statements is false ?
  - (A) Kernel stack can be used to store the context of a process
  - (B) User stack is used to store the function details during function calls
  - (C) Kernel stack is used to store the user program functional arguments
  - (D) Content of the process is useful to restart the process after some time

- 49. Consider a program, which spawn 20 threads to find out the sum of elements in a shared array of 200. Each thread i, takes elements A[i] to A[(20 \* i) 1] and compute local sum loc\_sum [i] and eventually adds loc\_sum[i] to a shared variable tot\_sum for total sum which of the following needs to be placed inside a critical section ?
  - (A) Reading array values
  - (B) Add to tot\_sum
  - $(C) \ Both \ (A) \ and \ (B)$
  - (D) Neither (A) nor (B)
- 50. The number of child processes are created using the following code :
  - int main()
    { fork(););
    - fork();
      fork();

return 0;

- }
- (A) 5
- (B) 6
- (C) 7
- (D) 8



# 51. ..... model takes the fundamental process activities of specification, development, validation and evolution and represents them as separate process phases such as requirements specification, software design, implementation, testing and so on.

- (A) The waterfall model
- (B) Incremental development
- (C) Reuse-oriented software engineering
- (D) Modular Approach
- 52. MDD stands for .....
  - (A) Model based driver development
  - (B) Model-driven development
  - (C) Model-development design
  - (D) Modular design development

53. ..... testing involves delivering a system to a number of potential customers who agree to use that system.

- (A) Unit
- (B) Beta
- (C) Alpha
- (D) Validation
- 54. The Dynamic System Development Method was developed in U.K. in the year ......
  - (A) **1988**
  - (B) **1989**
  - (C) 1990
  - (D) 1991
- 55. Which standard is used to prepare Software Requirement and Specification document ?
  - (A) ISO
  - (B) IEEE
  - (C) ACM
  - (D) OSI





- 56. Architectural models that may be developed may include : A ..... model that shows how the system is organised into processes at run-time.
  - (A) static structural
  - (B) dynamic process
  - (C) interface model
  - (D) relationship models
- 57. Software quality management for large systems can be structured into ...... main activities.
  - (A) Two
  - (B) Three
  - (C) Four
  - (D) Five
- 58. The first version of the COCOMO model (COCOMO 81) was a ..... level model where the levels corresponded to the detail of the analysis of the cost estimate.
  - (A) one
  - (B) two
  - (C) three
  - (D) four

- 59. Which testing is intended to reveal defects in the system rather than to simulate its operational use ?
  - (A) Defect testing
  - (B) Unit testing
  - (C) Black Box
  - (D) White Box
- 60. ..... procedures are concerned with analysing the costs and benefits of proposed changes, approving those changes that are worthwhile and tracking which components of the system have been changed.
  - (A) Change management
  - (B) Cost estimation
  - (C) Software
  - (D) Testing





- 61. Which of the following sorting does not have worst case running time of  $O(n^2)$  ?
  - (A) Merger sort
  - (B) Quick sort
  - (C) Insertion sort
  - (D) Bubble sort
- 62. In breadth first search of a graph, which data structure is used to hold nodes ?
  - (A) Array
  - (B) Queue
  - (C) Stack
  - (D) Graph
- 63. In the ..... traversal, we visit all of a vertex's descendants before we move on to an adjacent vertex.
  - (A) Breadth First
  - (B) Depth First
  - (C) Inorder
  - (D) Preorder

64. Identify the odd one :

- (A) Priority queue
- (B) Circular queue
- (C) Deque
- (D) Tower of Hanoi
- 65. Stack has applications in :
  - (A) Function calls
  - (B) Evaluation of arithmetic expressions
  - (C) Large number arithmetic
  - (D) All of the above
- 66. The post-order and in-order traversal of a Binary tree generates the same output. Then the tree is :
  - (A) Nearly balanced
  - (B) Completely balanced
  - (C) Right skewed
  - (D) Left skewed





- 67. Given a complete graph G with 5 vertices, then the graph G has how many spanning trees :
  - (A) 25
  - (B) 125
  - (C) 225
  - (D) 325
- 68. Consider an undirected graph G with vertices {A, B, C, D}. In graph G, every edge has distinct weight. Edge CD has minimum weight. Edge AB has maximum weight. Then, which of the following is false ?
  - (A) Every minimum spanning treeof G must contain CD
  - (B) If AB is in a minimum spanning tree, then its removal must disconnect G
  - (C) No minimum spanning tree contains AB
  - (D) G has a unique minimum spanning tree

69. Consider the graph shown below :



Which of the following are the edges in the MST (Minimum Spanning Tree) of the given graph ?

- (A) (*a*–*b*) (*a*–*c*) (*c*–*d*) (*c*–*e*)
- (B) (*a*-*b*) (*a*-*d*) (*c*-*d*) (*c*-*e*)
- (C) (a-b)(a-c)(b-c)(c-d)(c-e)
- (D) (*b*-*c*) (*a*-*c*) (*c*-*e*) (*c*-*e*)
- 70. In a directed graph, if there is a path from each vertex to every other vertex, then it is called :
  - (A) Weakly connected
  - (B) Tightly connected
  - (C) Strongly connected
  - (D) Loosely connected





- 71. In peephole optimization, constant folding involves :
  - (A) Combining consecutive loads
  - (B) Eliminating dead code
  - (C) Folding constant expressions during compilation
  - (D) Unrolling loops
- 72. Which of the following best describes the relationship between activation records and the call stack ?
  - (A) Activation records are stored in a heap, and the call stack is used for control flow
  - (B) Activation records are stored in call stack, representing the sequence of function calls
  - (C) Activation records are managed globally, and the call stack is used for loop constructs
  - (D) Activation records and call stack are unrelated concepts in memory management

73. In an L-attributed grammar, synthesized attributes are calculated using attributes from :

- (A) The same non-terminal
- (B) The parent non-terminal in the parse tree
- (C) The child non-terminal in the parse tree
- (D) The sibling non-terminal in the parse tree
- 74. If A is a top-down parser and B is a bottom-up parser, which of the following statements is false ?
  - (A) A generates the string to be parsed, beginning with the start symbol of the grammar
  - (B) B reduces the input string to the start symbol of the grammar
  - (C) A uses canonical reduction to check the syntactic errors
  - (D) B uses canonical reduction to reach the start symbol





The language  $L = \{a^n b^n c^n : n \ge 1\}$  is 75.a content sensitive language. Give a content sensitive grammar for L : (A)  $S \rightarrow aSbc | aAbc$  $Ab \ \rightarrow \ bA$ Ac  $\rightarrow$  Bbcc  $bB \rightarrow Bb$  $aB \rightarrow aa | aaA$ (B)  $S \rightarrow abc | aAbc$  $Ab \rightarrow bA$ Ac  $\rightarrow$  Bbcc  $bB \ \rightarrow \ Bb$  $aB \rightarrow aa | aaA$ (C)  $S \rightarrow abc | aAbc$  $Ab \rightarrow Ab$ Ac  $\rightarrow$  Bbcc  $bB \ \rightarrow \ Bb$  $aB \rightarrow aa | aaA$ (D)  $S \rightarrow abc | aAbc$  $A \rightarrow bA$  $A \rightarrow Bbcc$  $bB \rightarrow Bb$  $aB \rightarrow aa | aaA$ 

- 76. LF is recursively enumerable iff F satisfies which of the following conditions ?
  - If L is in F and L⊆L' for some recursively enumerable language L', then L' is in F (containment property).
  - (2) If L is an infinite language inF, then there is a finite subsetof L which is in F.
  - (3) The set of finite languages inF is enumerable.
  - $(A) \hspace{0.1in} (1) \hspace{0.1in} and \hspace{0.1in} (3)$
  - (B) (2) Only
  - (C) (1) and (2)

(D) (1), (2) and (3)





- 77. Let  $P_1$  be the problem of finding a Hamiltonian cycle in a graph G and  $P_2$  be the problem of determining if a Hamiltonian cycle exists in a graph. Which one of the following is true ?
  - (A) Both  $P_1$  and  $P_2$  are NP-Hard
  - (B)  $P_1$  is NP-Hard, but  $P_2$  is not
  - (C)  $P_2$  is NP-Hard, but  $P_1$  is not
  - (D) Neither  $P_1$  nor  $P_2$  is NP-Hard
- 78. Determine the language accepted by the following FA :



- (A) All strings containing 00 but not 011
- (B) All strings containing 00 but not 000
- (C) All strings containing 000 but not 00
- (D) All strings containing 11 but not 000

79. Give regular expression for the language that contains all strings with at least one occurrence of each symbol in  $\Sigma = \{a, b, c\}$ .

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- (A)  $(a + b + c)^*$  abc  $(a + b + c)^*$
- (B)  $(a + b + c)^* a (a + b + c)^*$ b  $(a + b + c)^* c (a + b + c)^*$
- (C)  $(a + b + c)^* a (a + b + c)^*$ b  $(a + b + c)^* c$
- (D) a  $(a + b + c)^*$  b  $(a + b + c)^*$ c  $(a + b + c)^*$
- 80. Let  $L_1$  and  $L_2$  be languages on the same alphabet. Then the right quotient of  $L_1$  with  $L_2$  is defined as :

(A)  $L_1/L_2 = \{x : xy \in L_1 \text{ for some} y \in L_2\}$ (B)  $L_1/L_2 = \{x : x \in L_1 \text{ for some} y \in L_2\}$ (C)  $L_1/L_2 = \{x : x \in L_1 \text{ for some} xy \in L_2\}$ (D)  $L_1 - L_2 = \{x : xy \in L_1 \text{ for some} y \in L_2\}$ 





- 81. How many number of transmission modes exists for data communication circuits ?
  - (A) 4
  - (B) 3
  - (C) 2
  - (D) 1
- 82. A ..... is used in data communication networks that transfer high-speed digital information between only two stations.
  - (A) multi-point
  - (B) point-to-point topology
  - (C) simplex
  - (D) duplex
- - (A) unipolar return to zero (UPRZ)
  - (B) return to zero (RZ)
  - (C) unipolar non-return to zero
    (UPNRZ)
  - (D) nonreturn to zero (NRZ)

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- 84. Which coaxial cable is used for analog transmission ?
  - (A) 25 ohm cable
  - (B) 50 ohm cable
  - (C) 75 ohm cable
  - (D) 100 ohm cable
- - (A) 2 and 4
  - (B) 4 and 16
  - (C) 16 and 32
  - (D) 32 and 64
- 86. In FDM, SPADE system full duplex service, the total transponder bandwidth used was ...... Mbps for uplink portion and ...... Mbps for downlink.
  - $(A) \ \ 25 \ \ and \ \ 50$
  - (B) 50 and 50
  - (C) 50 and 75
  - (D) 75 and 100





- 87. Which is the special bit pattern of flag byte in a frame ?
  - (A) 01010101
  - (B) 10110110
  - (C) 01111110
  - (D) 10011001
- 88. What is the name of the protocol in which the sender sends one frame and then waits for an acknowledgement before proceeding ?
  - (A) Goback n
  - (B) piggybacking
  - (C) sliding window
  - (D) stop and wait
- 89. Which code will be responded by the server which indicates ready to accept email message ?
  - (A) 250
  - (B) 334
  - (C) 221
  - $(D) \ 350$

- (A) Name server
- (B) Pointer
- (C) Host Description
- (D) IP address of a host
- 91. Which of the following is true related to satisfiable property ?
  - (A) A statement is satisfiable if there is some interpretation for which it is false
  - (B) A statement is satisfiable if some interpretation for which it is true
  - (C) A statement is satisfiable if there is no interpretation for which it is true
  - (D) A statement is satisfiable if there is no interpretation for which it is false





# 2. What are transposition rule ?

- (A) From P  $\rightarrow$  Q, infer ~ Q  $\rightarrow$  P
- (B) From P  $\rightarrow$  Q, infer Q  $\rightarrow$  ~ P
- (C) From P  $\rightarrow$  Q, infer Q  $\rightarrow$  P
- (D) From P  $\rightarrow$  Q, infer ~ Q ~ P
- 93. In language understanding, the levels of knowledge that does not include ?
  - (A) Phonological
  - (B) Syntactic
  - (C) Empirical
  - (D) Logical
- 94. Agents behavior can be best described by ......
  - (A) Perception sequence
  - (B) Agent function
  - (C) Sensors and actuators
  - (D) Environment in which agent is performing
- 95. A search algorithm takes ...... as an input and returns ..... as an output.
  - (A) Input, output
  - (B) Problem, solution
  - (C) Solution, problem
  - (D) Parameters, sequence of actions

96. Let A be a fuzzy set defined with respect to the universal set X defined for all  $x \in X$ , then :

- (A)  $\min[A(x), 1 A(x)] = 0$
- (B)  $\min[A(x), 1 A(x)] \neq 0$
- (C)  $\min[A(x), 1 A(x)] > 0$
- (D)  $\min[A(x), 1 A(x)] < 0$
- 97. For a crisp relation R(X, X), iff the pair  $\langle x, y \rangle \in R$  it is also the case that  $\langle y, x \rangle \in R$  for each  $x, y \in X$  for  $x \neq y$ , then such a relation is called as a ..... relation.
  - (A) transitive
  - (B) symmetric
  - (C) reflexive
  - (D) nontransitive
- - (A) reflexive
  - (B) symmetric
  - (C) transitive
  - (D) reflexive and transitive





99. Which type of crossover is performed in the following genetic algorithm problem ?



- (A) Matrix crossover (B) Multipoint even site crossover
- (C) Uniform crossover (D) Single site crossover
- 100. The weight w for the autoassociative BAM set of vectors  $(x_1, x_2, ..., x_L)$  is computed as ......

(A) 
$$\sum_{i=1}^{L} x_i x_i^t$$
 (B)  $\sum_{i=1}^{L} x_i^t x_i$   
(C)  $\sum_{i=1}^{L} \left(\frac{x_i}{x_i^t}\right)$  (D)  $\sum_{i=1}^{L} \left(\frac{x_i^t}{x_i}\right)$ 





## **ROUGH WORK**





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