

DO NOT OPEN THIS BOOKLET UNTIL YOU ARE ASKED TO DO SO			
Duration: 120 Minutes		Max Marks: 400	
NAME OF THE CANDIDATE (IN BLOCK LETTERS)		<input style="width: 100%;" type="text"/>	
SIGNATURE OF CANDIDATE		SIGNATURE OF INVIGILATOR	
Total number of questions attempted	<input style="width: 100%;" type="text"/>	Number of answers changed	<input style="width: 100%;" type="text"/>

General instructions:

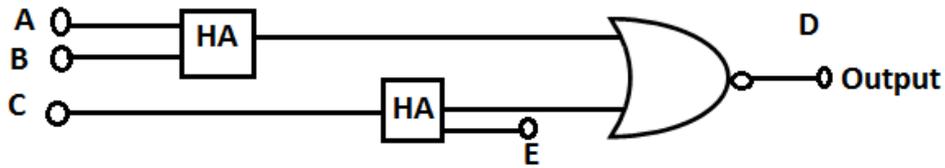
- 1) This booklet contains 100 multiple choice objective type questions.
- 2) Each correct answer carries **four** marks.
- 3) **One** mark will be deducted for each wrong answer.
- 4) Each question in the Booklet is followed by four probable answers which are indicated by letters **A, B, C, and D**. In the answer sheet provided separately, mark the letter indicating your correct answer on the box given against the question number. More than one letter in the box will be treated as wrong answer.
- 5) All rough work should be done in the space provided at the end of the Booklet.
- 6) Calculators, Mobile phones, pagers, Log tables and other electronic devices are not allowed.
- 7) Any kind of malpractice may lead to cancellation of your candidature.
- 8) All candidates should return this booklet to the invigilator at the end of the test.
- 9) Listen to the instructions given to you by the invigilator carefully. After the commencement of the examination, invigilators will not entertain any sort of questions.
- 10) At the end of the examination, fill Total number of questions attempted and number of answers changed.

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No of Right Answers	<input style="width: 100%;" type="text"/>	Valued by	Re-Checked by
No of Wrong Answers	<input style="width: 100%;" type="text"/>	<input style="width: 100%;" type="text"/>	<input style="width: 100%;" type="text"/>
Total Mark	<input style="width: 100%;" type="text"/>		

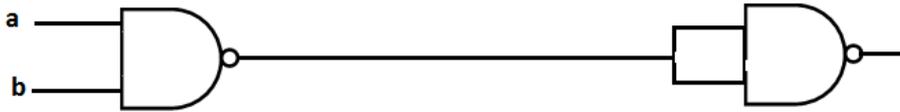
1. Which of the following propositions is tautology?
 - A. $(p \vee q) \rightarrow q$
 - B. $p \vee (q \rightarrow p)$
 - C. $p \vee (p \rightarrow q)$
 - D. Both B. & C.
2. $P \rightarrow (Q \rightarrow R)$ is equivalent to
 - A. $(P \wedge Q) \rightarrow R$
 - B. $(P \vee Q) \rightarrow R$
 - C. $(P \vee Q) \rightarrow \neg R$
 - D. PQ
3. Correct hierarchical relationship among context- free, right-linear, and context-sensitive language is
 - A. context-free \subset right-linear \subset context-sensitive
 - B. context-free \subset context-sensitive \subset right-linear
 - C. context-sensitive \subset right-linear \subset context-free
 - D. right-linear \subset context-free \subset context-sensitive
4. Which of the following is not possible algorithmically?
 - A. Regular grammar to context free grammar
 - B. Non-deterministic FSA to deterministic FSA
 - C. Non-deterministic PDA to deterministic PDA
 - D. Union and Intersection
5. Pumping lemma is generally used for proving that
 - A. given grammar is regular
 - B. given grammar is not regular
 - C. whether two given regular expressions are equivalent or not
 - D. given expression is regular
6. The time required for a gate or inverter to change its state is called
 - A. Rise time
 - B. Decay time
 - C. Propagation time
 - D. Charging time
7. The maximum frequency at which digital data can be applied to gate is called
 - A. Operating speed
 - B. Propagation speed
 - C. Binary level transaction period
 - D. Charging time
8. A one-to-four line demultiplexer is to be implemented using a memory. How many bits must each word have?
 - A. 1 bit
 - B. 2 bits
 - C. 4 bits
 - D. 8 bits
9. A toggle operation cannot be performed using a single
 - A. NOR gate
 - B. AND gate
 - C. NAND gate
 - D. XOR gate
10. Which table shows the electrical state of a digital circuit's output for every possible combination of electrical states in the inputs?
 - A. Function table
 - B. Truth table
 - C. Routing table
 - D. ASCII table

11. The circuit shown below is the



- A. Full adder B. Full subtractor
C. Parity checker D. None of these

12. The combinational circuit given below is implemented with two NAND gates. To which of the following individual gates is its equivalent?



- A. NOT B. OR
C. AND D. XOR

13. Consider the fractional knapsack instance $n=4$, $(p_1, p_2, p_3, p_4) = (10, 10, 12, 18)$ $(w_1, w_2, w_3, w_4) = (2, 4, 6, 9)$ and $M=15$. The maximum profit is given by, (Assume p and w denotes profit and weights of objects respectively).

- A. 40 B. 38
C. 32 D. 30

14. Which memory is difficult to interface with processor?

- A. Static memory B. Dynamic memory
C. ROM D. RAM

15. The idea of cache memory is based on

- A. The property of locality of reference
B. The heuristic 90-10 rule
C. The fact that only a small portion of a program is referenced relatively frequently
D. Virtual memory

16. How many RAM chips of size (256K x 1 bit) are required to build 1M Byte memory ?

- A. 8 B. 12 C. 24 D. 32

17. Four memory chips of 16 x 4 Size have their address bases connected together. The system will be of size

- A. 64 x 64 B. 16 x 16 C. 32 x 16 D. 256 x 10

18. Neuron can send _____ signal at a time.

- A. One B. Two C. Three D. Five to Ten

19. The process of creating a specific class from a class template is called

- A. instantiation B. instant class
C. function template D. template instantiation

20. Which of the following involves context switch?

- A. SPOOL B. processor
C. thread D. none of these

21. For 1MB memory, the number of address lines required is:
 A. 11 B. 16 C. 22 D. 24
22. In a signed magnitude notation, what is the minimum value that can be represented with 8 bits?
 A. -128 B. -255 C. -127 D. 0
23. Which of the following is not a feature of a cursor FOR loop?
 A. record type declaration
 B. opening and parsing of SQL statements
 C. fetches records from cursor
 D. requires exit condition to be defined
24. The command used to open a cursor FOR LOOP is
 A. open B. fetch C. parse D. None of these
25. What happens when rows are found using a FETCH statement?
 A. It causes the cursor to close
 B. It causes the cursor to open
 C. It loads the current rows values into variables
 D. It creates the variables to hold the current row values
26. Which procedure can be used to create a customized error message?
 A. RAISE_ERROR B. SQLERRM
 C. RAISE_APPLICATION_ERROR D. RAISE_SERVER_ERROR
27. After serving a page fault, the control returns to
 A. the next instruction
 B. depends on operating system
 C. the same instruction but the program halts
 D. the same instruction but the program hangs
28. Virtual memory is implemented by
 A. simple paging
 B. demand paging
 C. static partitioned memory management
 D. dynamic partitioned memory management
29. Web client talks to web server through
 A. TCP port 80 B. TCP port 21
 C. UDP port 80 D. UDP port 21.
30. POST-BLOCK trigger is a
 A. navigational trigger B. key trigger
 C. transactional trigger D. None of these
31. Which of the following packaged procedure is UNRESTRICTED?
 A. CALL_INPUT B. CLEAR-BLOCK
 C. EXECUTE_QUERY D. USER-EXIT
32. A free tree is defined as a connected undirected graph with
 A. 1 cycle B. 2 cycles C. 3 cycles D. No cycle

33. Depth-first traversal of a graph is roughly analogous to_____ traversal
 A. preorder B. inorder C. level-by-level D. postorder
34. The method of writing all operators either before their operands, or after them, is called
 A. polish notation B. infix C. postfix D. prefix
35. A linked binary tree with n nodes, $n \geq 0$ has exactly_____ NULL links.
 A. n B. n+1 C. n-1 D. n+2
36. The longest sequence of events in a project is called the_____ path.
 A. critical path B. activity path
 C. complex path D. PERT
37. Hungarian method is a way of solving operations research problem in
 A. LPP B. simplex method
 C. assignment method D. transportation method
38. Which of the following TCP/IP protocol is used for remote terminal connection service?
 A. TELNET B. FTP C. SLIP D. TFTP
39. Method of detecting and correcting transmission errors in data is known as
 A. handshake B. debugging
 C. hamming code D. checksum
40. Affine ciphers are defined by the formula $C \equiv aP + k \pmod{35}$, with appropriate values of a and k. The total number of affine ciphers are ...
 A. 840 B. 1224 C. 70 D. 1225
41. Let $P_1, P_2, P_3, \dots, P_N$ be the first n primes. Consider the number $XN = P_1 * P_2 * P_3 * \dots * P_N + 1$. Then,
 A. XN is a prime number
 B. XN is a pseudo prime number
 C. XN is a relatively prime number
 D. XN is a prime, or has prime divisors, all of them are greater than P_N
42. Consider the elliptic curve $y^2 = x^3 + bx + c$. The condition that the cubic is non singular is
 A. $4b^3 + 27c^2 \neq 0$ B. $b^2 - c^3 - 1 \neq 0$
 C. $b \neq 0$, and $c \neq 0$ D. $b \neq 0$
43. Which of the following operation is not associative but is commutative?
 A. AND B. OR C. NOR D. Exclusive – OR
44. Which of the following cannot be the order (the number of elements) of a finite field?
 A. 7 B. 8 C. 9 D. 10
45. If one decrypts a cipher text which was encrypted using standard Rabin scheme, how many possible plain text may obtain?
 A. 1 B. 2 C. 3 D. 4
46. Which of the following is most suitable for message integrity?
 A. MD5 B. SHA -1 C. RSA D. ECC

47. Security of crypto system depends on _____
- Hiding the underlying algorithm used
 - Difficulty of the one way function used.
 - The number of rounds the process is repeated
 - The size of the key used
48. Consider the following problems:
- Factorization problem
 - Discrete logarithm problem
 - Primality testing
 - Graph Colouring Problem
- Which one does not belong to the class of the others in the list?
- I
 - II
 - III
 - IV
49. To affix the authentication in RSA, which key(s) are used?
- Public key
 - Symmetric key
 - Private key
 - Inverted duplicate key
50. Which of the following statements is correct?
- $A = \{ a^n b^n \mid n = 0, 1, 2, 3, \dots \}$ is regular language
 - Set B of all strings of equal number of a's and b's defines a regular language
 - $L(A^* B^*) \cap B$ gives the set A
 - None of these
51. The CFG
 $s \rightarrow as \mid bs \mid a \mid b$
 is equivalent to regular expression
- $(a + b)$
 - $(a + b)(a + b)^*$
 - $(a + b)(a + b)$
 - None of these
52. A state is safe if the system can allocate resources to each process (up to its maximum) in some order and still avoid deadlock. Then
- deadlocked state is unsafe
 - unsafe state may lead to a deadlock situation
 - deadlocked state is a subset of unsafe state
 - all of these
53. A computer system has 6 tape drives, with 'n' processes competing for them. Each process may need 3 tape drives. The maximum value of 'n' for which the system is guaranteed to be deadlock free is
- 4
 - 3
 - 2
 - 1
54. Which module gives control of the CPU to the process selected by the short-term scheduler?
- dispatcher
 - interrupt
 - scheduler
 - none of the mentioned
55. RAID level 5 is also known as :
- bit-interleaved parity organization
 - block-interleaved parity organization
 - block-interleaved distributed parity
 - memory-style ECC organization

56. Segment replacement algorithms are more complex than page replacement algorithms because:
- Segments are better than pages
 - Pages are better than segments
 - Segments have variable sizes
 - Segments have fixed sizes
57. Time out determination policy is used in _____
- network layer
 - data link layer
 - transport layer
 - application layer
58. For applications such as audio and video streaming, the variation in the packet arrival times is called _____
- Random early detection
 - Jitter
 - Delay difference
 - Load shedding
59. The time required for a gate or inverter to change its state is called
- Rise time
 - Decay time
 - Propagation time
 - Charging time
60. Which of the following circuit can be used as parallel to serial converter?
- Multiplexer
 - Demultiplexer
 - Decoder
 - Digital counter
61. If four 4 input multiplexers drive a 4 input multiplexer, we get a:
- 16 input MUX
 - 8 input MUX
 - 4 input MUX
 - 2 input MUX
62. All the following hidden surface algorithms employ image space approach except
- back face removal
 - depth buffer method
 - scan line method
 - depth sort method
63. The subcategories of orthographic projection are
- cavalier, cabinet, isometric
 - cavalier, cabinet
 - isometric, dimetric, trimetric
 - isometric, cavalier, trimetric
64. Adaptive system management is
- It uses machine-learning techniques. Here program can learn from past experience and adapt themselves to new situations
 - Computational procedure that takes some value as input and produces some value as output.
 - Science of making machines performs tasks that would require intelligence when performed by humans
 - None of these
65. How many addresses are required for 25 x 40 video RAM?
- 1020
 - 1920
 - 1000
 - 1500
66. Memory refreshing may be done
- By the CPU that contains a special refresh counter, only
 - By an external refresh controller, only
 - Either by the CPU or by an external refresh controller
 - None of these

67. Feature of ANN in which ANN creates its own organization or representation of information it receives during learning time is
- A. Adaptive Learning B. Self Organization
C. What-If Analysis D. Supervised Learning
68. The graph that shows basic blocks and their successor relationship is called
- A. DAG B. Flow graph
C. control graph D. Hamiltonion graph
69. Consider the declarations
- ```
char a;
const char aa = 'h';
char *na;
const char *naa;
```
- Which of the following statements
- Statement I: aa = a;  
Statement II: na = &a;  
Statement III: na = &aa;
- is/are illegal?
- A. Only I and II  
B. Only II and III  
C. Only I and III  
D. All the three statements are illegal
70. The main purpose of the system investigation phase is to produce
- A. a design report                                 B. a requirement report  
C. a feasibility report                             D. none of these
71. Errors may be found by "outsiders" during
- A. a structured walk through                      B. alpha testing  
C. beta testing                                      D. All of these
72. The command echo welcome > /dev / tty
- A. Echoes welcome in all the terminals that are switched on.  
B. Echoes welcome in all the terminals that are logged on.  
C. Echoes welcome only in the terminal in which it is run.  
D. Both (a) and (c)
73. Which of the following are not filter programs?
- A. date                      B. sort                      C. cat                      D. Grep
74. The first thing that is searched when a UNIX command references a file is
- A. i-node                                              B. i-node number  
C. permission setting                             D. none of the above
75. If S is an array of 80 characters, then the value assigned to S through the statement scanf("%s",S) with input 1 2 3 4 5 would be
- A. "12345"                                              B. nothing since 12345 is an integer  
C. S is an illegal name for string                 D. %s cannot be used for reading in values of S

76. If  $x$  is an array of integer, then the value of  $\&x[i]$  is same as
- $\&x[i-1] + \text{sizeof}(\text{int})$
  - $x + \text{sizeof}(\text{int}) * i$
  - $x+i$
  - none of these
77. Which of the following statement(s) is/are false?
- A connected multigraph has an Euler Circuit if and only if each of its vertices has even degree.
  - A connected multigraph has an Euler Path but not an Euler Circuit if and only if it has exactly two vertices of odd degree.
  - A complete graph ( $K_n$ ) has a Hamilton Circuit whenever  $n \geq 3$
  - A cycle over six vertices ( $C_6$ ) is not a bipartite graph but a complete graph over 3 vertices is bipartite.
- (a) only
  - (b) and (c)
  - (c) only
  - (d) only
78. Which of the following in 8085 microprocessor performs  $HL = HL + HL$  ?
- DAD D
  - DAD H
  - DAD B
  - DAD SP
79. A tree with  $n$  vertices is called graceful, if its vertices can be labelled with integers  $1, 2, \dots, n$  such that the absolute value of the difference of the labels of adjacent vertices are all different.
- Which of the following trees are graceful?
- (a) and (b)
  - (b) and (c)
  - (a) and (c)
  - (a), (b) and (c)
80. Which of the following page replacement algorithms suffers from Belady's Anomaly ?
- Optimal replacement
  - LRU
  - FIFO
  - Both optimal replacement and FIFO
81. A process refers to 5 pages, A, B, C, D, E in the order : A, B, C, D, A, B, E, A, B, C, D, E. If the page replacement algorithm is FIFO, the number of page transfers with an empty internal store of 3 frames is :
- 8
  - 10
  - 9
  - 7
82. What is cipher-block chaining?
- Data is logically 'ANDed' with previous block
  - Data is logically 'ORed' with previous block
  - Data is logically 'XORed' with previous block
  - none of the mentioned
83. SHA-1 produces \_\_\_ bit of hash ?
- 128
  - 160
  - 150
  - 112
84. A process P1 has a period of 50 and a CPU burst of  $t_1 = 25$ , P2 has a period of 80 and a CPU burst of 35. The total CPU utilization is :
- 0.90
  - 0.74
  - 0.94
  - 0.80
85. Contents of an index register are multiplied by a scale factor that may be added further to get the operand offset in
- base scaled indexed mode
  - scaled indexed mode
  - indexed mode
  - none of the mentioned

86. A 16-bit displacement that references a memory location using any of the addressing modes is  
 A. pointer      B. character      C. BCD      D. offset
87. The instruction, MOV AX, 0005H belongs to the address mode  
 A. register      B. direct      C. immediate      D. register relative
88. The instruction, JMP 5000H:2000H; is an example of  
 A. intrasegment direct mode      B. intrasegment indirect mode  
 C. intersegment direct mode      D. intersegment indirect mode
89. If there is a trace cache miss, then the instruction bytes are required to be fetched from the  
 A. instruction decoder      B. Level2 cache  
 C. execution module      D. none of the mentioned
90. After completion of first cycle, the first task is again scheduled for the next cycle. This process is known as  
 A. repetition      B. task switch operation  
 C. processor initiation      D. none of the mentioned
91. Decision trees are appropriate for the problems where:  
 A. Attributes are both numeric and nominal  
 B. Target function takes on a discrete number of values.  
 C. Data may have errors  
 D. All of the mentioned
92. What does the Bayesian network provides?  
 A. Complete description of the domain  
 B. Partial description of the domain  
 C. Complete description of the problem  
 D. None of the mentioned
93. \_\_\_\_\_ are algorithms that learn from their more complex environments (hence eco) to generalize, approximate solution logic and simplify  
 A. Fuzzy Relational DB  
 B. Ecorithms  
 C. Fuzzy Set  
 D. None of the mentioned
94. To which depth does the alpha-beta pruning can be applied?  
 A. 10 states      B. 8 States      C. 6 States      D. Any depth
95. A binary search tree whose left subtree and right subtree differ in height by at most 1 unit is called \_\_\_\_\_  
 A. AVL tree      B. Red-black tree  
 C. Lemma tree      D. None of the above
96. Suppose the elements 7, 2, 10 and 4 are inserted, in that order, into the valid 3- ary max heap found in the above question, Which one of the following is the sequence of items in the array representing the resultant heap?  
 A. 10, 7, 9, 8, 3, 1, 5, 2, 6, 4      B. 10, 9, 8, 7, 6, 5, 4, 3, 2, 1  
 C. 10, 9, 4, 5, 7, 6, 8, 2, 1, 3      D. 10, 8, 6, 9, 7, 2, 3, 4, 1, 5

97. What does the following function do for a given Linked List with first node as head?

```
void fun1(struct node* head)
{
if(head == NULL)
return;
fun1(head->next);
printf("%d ", head->data);
}
```

- A. Prints all nodes of linked lists
- B. Prints all nodes of linked list in reverse order
- C. Prints alternate nodes of Linked List
- D. Prints alternate nodes in reverse order

98. Suppose a binary tree is constructed with n nodes, such that each node has exactly either zero or two children. The maximum height of the tree will be?

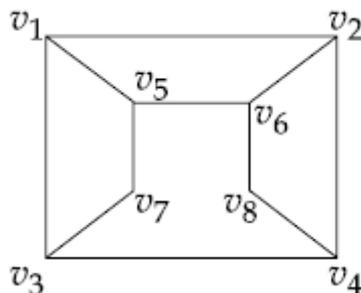
- A.  $(n+1)/2$
- B.  $(n-1)/2$
- C.  $n/2 - 1$
- D.  $(n+1)/2 - 1$

99. The STUDENT information in a university is stored in the relation STUDENT (Name, Sex, Marks, DEPT\_Name)

Consider the following SQL Query `SELECT DEPT_Name from STUDENT where SEX='M' group by DEPT_Name having avg (Marks)>(SELECT avg (Marks) from STUDENT)`. It returns the Name of the Department for which:

- A. The Average marks of Male students is more than the average marks of students in the same Department
- B. The average marks of male students is more than the average marks of the students in the University
- C. The average marks of male students is more than the average marks of male students in the University
- D. The average marks of students is more than the average marks of male students in the University

100. Consider the graph given below:



The two distinct sets of vertices, which make the graph bipartite are:

- A.  $(v1, v4, v6); (v2, v3, v5, v7, v8)$
- B.  $(v1, v7, v8); (v2, v3, v5, v6)$
- C.  $v1, v4, v6, v7); (v2, v3, v5, v8)$
- D.  $(v1, v4, v6, v7, v8); (v2, v3, v5)$

**SPACE FOR ROUGH WORK**

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