M·Sc· Computer
Science

10P/208/31

Question Booklet No................................

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( To be filled up by the candidate by blue / black ball-point pen )

Roll No.

Roll No. (Write the digits in words)...............................................................................................................................

Serial No. of Answer Sheet..............................

Day and Date.....................................................

.............................................................
( *Signature of Invigilator* )

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## INSTRUCTIONS TO CANDIDATES

(Use only *blue/black ball-point pen* in the space above and on both sides of the **Answer Sheet**)

1. Within 10 minutes of the issue of the Question Booklet, check the Question Booklet to ensure that it contains all the pages in correct sequence and that no page/question is missing in case of faulty Question Booklet bring it to the notice of the Superintendent/Invigilators immediately to obtain a fresh Question Booklet.

2. Do not bring any loose paper, written or blank, inside the Examination Hall *except the Admit Card without its envelope.*

3. A separate Answer Sheet is given. *It should not be folded or mutilated. A second Answer Sheet shall not be provided. Only the Answer Sheet will be evaluated.*

4. Write your *Roll Number and Serial Number of the Answer Sheet by pen* in the space provided above.

5. *On the front page of the Answer Sheet, write by pen your Roll Number in the space provided at the top, and by darkening the circles at the bottom. Also, wherever applicable, write the Question Booklet Number and the Set Number in appropriate places.*

6. No overwriting is allowed in the entries of Roll No., Question Booklet No. and Set No. (if any) on OMR sheet and Roll No. and OMR sheet No. on the Question Booklet.

7. Any changes in the aforesaid entries is to be verified by the invigilator, otherwise it will be taken as unfair means.

8. Each question in this Booklet is followed by four alternative answers. *For each question, you are to record the correct option on the Answer Sheet by darkening the appropriate circle in the corresponding row of the Answer Sheet, by pen as mentioned in the guidelines given on the first page of the Answer Sheet.*

9. For each question, darken only one circle on the Answer Sheet. If you darken more than one circle or darken a circle partially, the answer will be treated as incorrect.

10. *Note that the answer once filled in ink cannot be changed.* If you do not wish to attempt a question leave all the circles in the corresponding row blank (such question will be awarded zero marks).

11. For rough work, use the inner back page of the title cover and the blank page at the end of this Booklet.

12. Deposit *both the Question Booklet and the Answer Sheet* at the end of the Test.

13. You are not permitted to leave the Examination Hall until the end of the Test.

14. If a candidate attempts to use any form of unfair means, he/she shall be liable to such punishment as the University may determine and impose on him/her.

[ उपर्युक्त निर्देश हिन्दी में अन्तिम आवरण-पृष्ठ पर दिये गए हैं ]

Total No. of Printed Pages : 29

**No. of Questions : 150**

प्रश्नों की संख्या : 150

*Time* : 2 hours] [*Full Marks* : 450

समय : 2 घण्टे] [पूर्णांक : 450

**Note** : (1) Attempt as many questions as you can. Each question carries **3** (Three) marks. ***One mark will be deducted for each incorrect answer.*** Zero mark will be awarded for each unattempted question.

अधिकाधिक प्रश्नों को हल करने का प्रयत्न करें। प्रत्येक प्रश्न **3 (तीन)** अंक का है। ***प्रत्येक गलत उत्तर के लिए एक अंक काटा जायेगा।*** प्रत्येक अनुत्तरित प्रश्न का प्राप्तांक शून्य होगा।

(2) If more than one alternative answers seem to be approximate to the correct answer, choose the closest one.

यदि एकाधिक वैकल्पिक उत्तर सही उत्तर के निकट प्रतीत हो, तो निकटतम सही उत्तर दें।

1. E-R modelling technique is a

   (1) Top-down approach     (2) Bottom up approach
   (3) Left-right approach     (4) Diagonal approach

2. Functional dependencies are generalization of

   (1) Key dependencies     (2) Relation dependencies
   (3) Database dependencies     (4) Non-key dependencies

3. A relational model which allows non-atomic domain is

   (1) Nested relational data model
   (2) Non-atomic data model
   (3) Hierarchical data model
   (4) Both (1) and (2)

4. A functional dependency of the form $x \to y$ is trival if

   (1) $y \subseteq x$        (2) $y \subset x$
   (3) $x \subseteq y$        (4) $x \subset y$ and $y \subset x$

5. Relations produced from an E-R model will always be in

   (1) First normal form      (2) Second normal form
   (3) Third normal form      (4) Fourth normal form

6. Which of the following is not a logical database structure ?

   (1) Tree     (2) Relational     (3) Network     (4) Chain

7. The database environment has all of the following components except

   (1) Users        (2) Separate files
   (3) Database      (4) Database administration

8. Database management systems are intended to

   (1) Eliminate data redundancy
   (2) Manage file access
   (3) Maintain data integrity
   (4) All of these

9. An indexing operation

   (1) Sorts a file using a single key
   (2) Sorts a file using two keys
   (3) Established an index for a file
   (4) Both (2) and (3)

10. Which of the following commands permanently delete the record marked for deletion from the database field ?

   (1) PACK    (2) ZAP    (3) SEEK    (4) SKIP

11. Updating a database means

   (1) Revising the file structure
   (2) Reorganising the database
   (3) Modifying or adding record occurrences
   (4) Both (1) and (2)

12. Which of the following is true of a network structure ?

   (1) It is physical representation of data
   (2) It allows a many-to-many relationship
   (3) It is conceptually simple
   (4) It will be the dominant database of the future

13. A data dictionary doesn't provide information about

   (1) Where data is located
   (2) The size of the disk storage disk
   (3) Who owns or is responsible for the data
   (4) How the data is used

14. Goals for the design of the logical schema include

   (1) Avoiding data inconsistency

   (2) Being able to construct queries easily

   (3) Being able to access data efficiently

   (4) All of these

15. In a multiuser database, if two users wish to update the same record at the same time, they are prevented from doing so by

   (1) Jamming           (2) Password

   (3) Documentation     (4) Record lock

16. Which of the following page replacement algorithms suffers from Belady's anomaly ?

   (1) Optimal replacement     (2) LRU

   (3) FIFO               (4) Both (1) and (3)

17. If there are 32 segments, each of size 1 kbytes, then the logical address should have

   (1) 13 bits     (2) 14 bits     (3) 15 bits     (4) 16 bits

.8. The main function of shared memory is to

   (1) Use primary memory efficiently

   (2) Do intra process communication

   (3) Do inter process communication

   (4) All of the above

19. A system has 3 processes sharing 4 resources. If each process needs a maximum of 2 units then, deadlock

(1) Can never occur      (2) May occur

(3) Has to occur      (4) Both (2) and (3)

20. Distributed systems should

(1) Met prescribed time constraints

(2) Aim better resource sharing

(3) Aim better system utilization

(4) Aim low system overhead

21. Memory protection is normally done by the

(1) Processor and the associated hardware

(2) Operating system

(3) Compiler

(4) User program

22. Which of the following scheduling algorithms gives minimum average waiting time ?

(1) FCFS      (2) SJF

(3) Round-robin      (4) Priority

23. At a particular time, the value of a counting semaphore is 10. It will become 7 after

(1) 3 V operations

(2) 8 P operations

(3) 5 V operations and 2 P operations

(4) 13 P operations and 10 V operations

24. Semaphores are used to solve the problem of

    (1) Race condition     (2) Process synchronization

    (3). Mutual exclusion     (4) Both (2) and (3)

25. Preemptive scheduling, is the strategy of temporarily suspending a running process

    (1) Before the CPU time slice expires

    (2) To allow starving process to run

    (3) When it requests I/O

    (4) Both (3) and (4)

26. The size of the virtual memory depends on the size of the

    (1) Data bus     (2) Main memory

    (3) Address bus     (4) Control bus

27. For implementing a multiprogramming operating system

    (1) Special support from processor is essential

    (2) Special support from processor is not essential

    (3) Cache memory must be available

    (4) More than one processor must be available

28. Suppose that a process is in 'BLOCKED' state waiting for some I/O service. When the service is completed, it goes to the

    (1) RUNNING state     (2) READY state

    (3) SUSPENDED state     (4) TERMINATED state

29. In a paged memory, the page hit ratio is 0.35. The time required to access a page in secondary memory is equal to 100 ns. The time required to access a page in primary memory is 10 ns. The average time required to access a page is

(1) 3.0 ns     (2) 68.0 ns     (3) 68.5 ns     (4) 78.5 ns

30. Dirty bit for a page in a page table

(1) Helps avoid unnecessary writes on a paging device

(2) Helps maintain LRU information

(3) Allows only read on a page

(4) All of the above

31. The amount of uncertainty in a system of symbol is called

(1) Bandwidth     (2) Entropy

(3) Loss     (4) Quantum

32. The receiver equalizer in a synchronous modem is called

(1) Impairment equalizer     (2) Adaptive equalizer

(3) Statistical equalizer     (4) A compromise equalizer

33. The loss in signal power as light travels down the fiber is called

(1) Propagation     (2) Attenuation

(3) Scattering     (4) Absorption

34. The Ethernet design does not provide

   (1) Access control
   (2) Addressing
   (3) Automatic retransmission of a message
   (4) Multiple-virtual networks

35. Maximum data rate of a channel for a noiseless 3-kHz binary channel is

   (1) 3000 bps    (2) 6000 bps    (3) 1500 bps    (4) 5000 bps

36. End-to-End connectivity is provided from host to host in

   (1) The network layer
   (2) The transport layer
   (3) The session layer
   (4) It is a combined functionality of the network and the data link layer

37. The parameter which gives the probability of the transport layer itself spontaneously terminating a connection due to internal problems is called

   (1) Protection           (2) Resilience
   (3) Option negotiation    (4) Transfer failure

38. Choose the correct statement

   (1) Baseband network uses analog technology
   (2) Broadband network uses digital technology
   (3) Baseband network is Time Division Multiplexed
   (4) In broadband network, the carrier signals operate at lower frequency

39. Adaptive or dynamic directory used in packet routing changes

   (1) Within each user session
   (2) With each user session
   (3) At system generation time only
   (4) Both (1) and (2)

40. For a sliding window of size $n-1$, there can be maximum of how many frames sent but unacknowledged ?

   (1) 0          (2) $n-1$          (3) $n$          (4) $n+1$

41. Which one of the following are regarded as WAN protocols ?

   (1) Frame relay          (2) Slip
   (3) IEEE 802.6          (4) X.25

42. When data is transmitted from device $A$ to device $B$, the header from $A$'s layer 5 is read by $B$'s

   (1) Physical layer          (2) Transport layer
   (3) Session layer          (4) Presentation layer

43. Which of the following access control methods is probabilistic ?

   (1) Polling          (2) Contention
   (3) Token passing          (4) Sliding window

44. Decryption and encryption of data are the responsibility of which of the following layer ?

   (1) Physical          (2) Data link
   (3) Presentation          (4) Session

**45.** In which topology, if there are $n$ devices in a network, each device has $n - 1$ ports for cables?

   (1) Mesh      (2) Star      (3) Bus      (4) Ring

**46.** Which of the following need not be a binary tree?

   (1) Search tree         (2) Heap

   (3) AVL-Tree          (4) B-Tree

**47.** Assume 5 buffer pages are available to sort a file of 105 pages. The cost of sorting using $m$-way merge sort is

   (1) 206      (2) 618      (3) 840      (4) 926

**48.** A 3-ary tree is a tree in which every internal node has exactly 3 children. The number of leaf nodes in such a tree with 6 internal nodes will be

   (1) 10      (2) 23      (3) 17      (4) 13

**49.** Linked lists are not suitable for implementing

   (1) Insertion sort       (2) Binary search

   (3) Radix sort         (4) Polynomial manipulation

**50.** Which of the following algorithm design technique is used in the quick sort algorithm?

   (1) Dynamic programming    (2) Backtracking

   (3) Divide and conquer      (4) Greedy method

                 *(Continued)*

51. The infix priorities of +, * , ∧ , / could be

    (1) 5, 1, 2, 7    (2) 7, 5, 2, 1    (3) 1, 2, 5, 7    (4) 5, 2, 2, 4

52. In a circularly linked list organization, insertion of a record involves the modification of

    (1) No pointer          (2) 1 pointer
    (3) 2 pointers          (4) 3 pointers

53. The number of binary trees with 3 nodes which when traversed in post-order gives the sequence *A, B, C* is

    (1) 3          (2) 9          (3) 7          (4) 5

54. Which of the file organizations is preferred for secondary key processing ?

    (1) Indexed sequential file organization
    (2) Two-way linked list
    (3) Inverted file organization
    (4) Sequential file organization

55. For merging two sorted lists of sizes *m* and *n* into a sorted list of size *m* + *n*, we require comparisons of

    (1) $O(m)$              (2) $O(n)$
    (3) $O(m+n)$            (4) $O(\log(m)+\log(n))$

56. A sorting technique that guarantees, that records with same primary key occurs in the same order in the sorted list as in the original unsorted list is said to be

    (1) Stable              (2) Consistent
    (3) External            (4) Linear

**57.** The number of possible binary trees with 4 nodes is

(1) 12  (2) 13  (3) 14  (4) 15

**58.** You are asked to sort 15 randomly generated numbers, you should prefer

(1) Bubble sort  (2) Quick sort
(3) Merge sort  (4) Heapsort

**59.** Consider that $n$ elements are to be sorted. What is the worst case time complexity of shell sort?

(1) $O(n)$  (2) $O(n \log_2 n)$
(3) $O(n^{1.2})$  (4) $O(n^2)$

**60.** The infix expression $A + (B - C) * D))$ is correctly represented in prefix notation as

(1) $A + B - C * D$  (2) $+ A * - BCD$
(3) $ABC - D * +$  (4) $A + BC - D *$

**61.** How many values can be held by an array $A [-1 ... m, 1 ... m]$

(1) $m$  (2) $m^2$  (3) $m(m+1)$  (4) $m(m+2)$

**62.** The recurrence relation $T(n) = mT(n/2) + an^2$ is satisfied by

(1) $T(n) = O(n^m)$  (2) $T(n) = O(n \log m)$
(3) $T(n) = O(n^{\log m})$  (4) $T(n) = O(m^{\log n})$

63. The time required to find shortest path in a graph with $n$ vertices and $c$ edges is

(1) $O(e)$   (2) $O(n)$     (3) $O(e^2)$     (4) $O(n^2)$

64. The minimum number of fields with each node of doubly linked list is

(1) 1     (2) 2     (3) 3     (4) 4

65. A full binary tree with $n$ non-leaf nodes contains

(1) $\log_2 n$ nodes        (2) $n + 1$ nodes
(3) $2n$ nodes        (4) $2n + 1$ nodes

66. A graph in which all nodes are of equal degree is known as

(1) Multi graph        (2) Non-regular graph
(3) Regular graph        (4) Complete graph

67. The length of a Hamiltonian path in a connected graph of $n$ vertices is

(1) $n - 1$     (2) $n$       (3) $n + 1$     (4) $n/2$

68. Let a graph $G$ has edge connectivity $\alpha$ and node connectivity $\beta$. Then

(1) $\alpha < \beta$     (2) $\alpha = \beta$     (3) $\alpha \geq \beta$     (4) $\alpha \leq \beta$

69. $A$, $B$ and $C$ are Boolean matrices. Which of the following statements is wrong?

(1) $(A \vee B) \vee C = A \vee (B \vee C)$
(2) $A \odot (B \odot C) = (A \odot B) \odot C$
(3) $A \wedge (B \vee C) = (A \wedge B) \vee (A \wedge C)$
(4) $A \vee (B \wedge C) = (A \wedge B) \vee (A \wedge C)$

**70.** In how many ways can six men and six women be seated in a row if any person may sit next to any other person ?

(1) 12!       (2) 12!/2       (3) 6!       (4) 6!/4

**71.** Let $A = \{1, 2, 5, 8, 11\}$, which of the following is False ?

(1) $\{5, 1\} \subseteq A$    (2) $\{8, 1\} \in A$    (3) $\phi \subseteq A$      (4) $\{2\} \subseteq A$

**72.** $(P \vee Q) \wedge (P \to R) \wedge (Q \to S)$ is equivalent to

(1) $S \wedge R$      (2) $S \to R$      (3) $S \vee R$      (4) $P \to R$

**73.** The equation $x^5 + x^3 - 8x - 5 = 0$ has

(1) Exactly 3 real roots and 2 complex roots
(2) No complex root
(3) No real root
(4) Exactly 2 real roots and 3 complex roots

**74.** The number of permutations of $n$ different things taken not more than $r$ at a time, with repetitions being allowed, is

(1) $(n^r - 1)/(n - 1)$      (2) $(n^r - 1)/(n - 1)!$
(3) $n(n^r - 1)/(n - 1)$      (4) $(n^r - 1)/n!$

**75.** A relation $R$ is defined in $N \times N$, such that $(a, b) R (c, d)$ if $a + d = b + c$. The relation $R$ is

(1) Reflexive but not transitive
(2) Reflexive and transitive, but not symmetric
(3) An equivalence relation
(4) A partial order

76. Two events $A$ and $B$ have probabilities 0.25 and 0.5 respectively. The probability that both $A$ and $B$ occur simultaneously is 0.14. Then the probability that neither $A$ nor $B$ occurs is

    (1) 0.25      (2) 0.75      (3) 0.39      (4) 0.11

77. The advantages of partial pivoting in the solution of a system of equations are

    (1) Division by zero can be avoided
    (2) Round off errors can be minimized
    (3) Ill conditioned system can be handled efficiently
    (4) All of the above

78. If one has to obtain the roots of $x^2 - 2x + \log 2 = 0$ to four decimal places, $\log 2$ should be given to the accuracy of approximately

    (1) $6 \times 10^{-5}$    (2) $7 \times 10^{-6}$    (3) $8 \times 10^{-5}$    (4) $9 \times 10^{-7}$

79. Newton-Raphson method

    (1) Is not sufficient in handling multiple roots
    (2) Has slow rate of convergence
    (3) Should not be preferred if there is a point of inflexion in the vicinity of the root
    (4) All of the above

80. In the Bisection method for finding the roots of an equation, the approximate relative error is always

    (1) Greater than relative error
    (2) Equals to the relative error
    (3) Less than relative error
    (4) All of the above

81.  The solution of the differential equation $y'' + 3y' + 2y = 0$ is of the form

(1) $c_1 e^x + c_2 e^{2x}$

(2) $c_1 e^{-x} + c_2 e^{3x}$

(3) $c_1 e^{-x} + c_2 e^{-2x}$

(4) $c_1 e^{-2x} + c_2 e^{-x}$

82.  $A, B$ are two 8-bit numbers such that $A + B \leqslant 2^8$. The number of possible combinations of $A$ and $B$ is

(1) $2^9$　　(2) $2^8$　　(3) $2^{16}$　　(4) $2^4 - 1$

83.  $(G, *)$ is an Abelian group. Then

(1) $x = x^{-1}$, for any $x$ belonging to $G$

(2) $x = x^2$, for any $x$ belonging to $G$

(3) $(x * y)^2 = x^2 * y^2$, for any $x, y$ belonging to $G$

(4) $G$ is of finite order

84.  Let the elements $g, h$ belong to group $G$. If $O(h)$ is 2, then $O(ghg^{-1})$ is

(1) 0　　(2) 1　　(3) 2　　(4) 4

85.  If $^nC_{r-1} = 36$, $^nC_r = 84$, and $^nC_{r+1} = 126$, then the value of $r$ is

(1) 9　　(2) 6　　(3) 5　　(4) 3

86.  If the proposition $\sim P \Rightarrow Q$ is true, then the truth value of the proposition $\sim P \vee (P \Rightarrow Q)$, is

(1) True

(2) Multi-valued

(3) False

(4) Cannot be determined

　　*(Continued)*

87. The error in using Simpson's rule is of the order

    (1) $h^2$　　　　(2) $h^3$　　　　(3) $h^4$　　　　(4) $h^5$

88. For an input pulse train of clock period $T$, the delay produced by an $n$ stage shift register is

    (1) $(n-1)T$　　(2) $nT$　　　　(3) $(n+1)T$　　(4) $2nT$

89. An $n$ stage ripple counter can count up to

    (1) $2^n$　　　　(2) $2^n - 1$　　　(3) $n$　　　　(4) $2^{n-1}$

90. How many flip-flops are needed to divide the input frequency by 64 ?

    (1) 4　　　　　(2) 5　　　　　(3) 6　　　　　(4) 8

91. The functional difference between SR flip-flop and JK flip-flop is that

    (1) JK flip-flop is faster than SR flip-flop
    (2) JK flip-flop has a feedback path
    (3) JK flip-flop accepts both inputs 1
    (4) JK flip-flop does not require external clock

92. In a T flip-flop, the ratio of the frequency of an output pulse wave to the input wave pulse is

    (1) 1/2　　　　(2) 1　　　　　(3) 2　　　　　(4) 4

93. A demultiplexer is used to

   (1) Route the data from a single input to one of the many outputs
   (2) Select data from several inputs and route it to a single output
   (3) Perform serial to parallel data conversion
   (4) Perform parity checking

94. A combinational logic circuit which is used when it is desired to send data from two or more sources through a single transmission line is known as

   (1) Encoder           (2) Decoder
   (3) Demultiplexer     (4) Multiplexer

95. The NAND can function as a NOT gate if

   (1) inputs are connected together
   (2) inputs are left open
   (3) one input is set to 0
   (4) one input is set to 1

96. Which of the following logic expression is incorrect ?

   (1) $1 \oplus 0 = 1$        (2) $1 \oplus 1 \oplus 0 = 1$
   (3) $1 \oplus 1 \oplus 1 = 1$      (4) $1 \oplus 1 = 0$

97. The 2's complement of binary number 010111.1100 is

   (1) 101001.1100      (2) 010111.0011
   (3) 101000.0100      (4) 101000.0011

**98.** The octal equivalent of decimal 324.987 is

(1) 504.771

(2) 540.781

(3) 215.234

(4) 40.987

**99.** The sum of weights in a self-complementing BCD code must be

(1) 7

(2) 9

(3) 10

(4) 8

**100.** Which of the following logic family is the fastest?

(1) $I^2L$

(2) TTL

(3) CMOS

(4) ECL

**101.** What is the form of the Boolean expression $AB + \overline{BC} = Y$?

(1) Product-of-sums

(2) Sum-of-products

(3) Karnaugh map

(4) Matrix

**102.** If $(123)_5 = (A3)_{B'}$ ; then the number of possible values of A is

(1) 4

(2) 1

(3) 3

(4) 2

**103.** If a particular idea can be implemented in hardware or software, the factor(s) that favour hardware implementation is/are

(1) Cos effectiveness

(2) Speed of operation

(3) Reliability

(4) Both (2) and (3)

104. Which of the following remarks about bit-slice processor is correct ?

   (1) It can be cascaded to get any desired word length processor
   (2) Its speed of operation is independent of the word length configured
   (3) It does not contain anything equivalent of a program counter in a normal microprocessor
   (4) It contains only the data path of a normal CPU

105. Choose the correct statement

   For a microprocessor system using I/O mapped I/O

   (1) Memory space available is greater
   (2) Not all data transfer instructions are available
   (3) I/O and memory address spaces are distinct
   (4) I/O address space is greater

106. Microprogram is

   (1) The name of a source program in micro computers
   (2) The set of instructions indicating the primitive operations in a system
   (3) A primitive form of macros used in assembly language programming
   (4) A program of very small size

107. The register which keeps track of the execution of a program and which contains the memory address of the instruction currently being executed is called

   (1) Index register
   (2) Memory address register
   (3) Program counter
   (4) Instruction register

108. The register used as a working area in CPU is

(1) Program counter     (2) Instruction register

(3) Instruction decoder     (4) Accumulator

109. An interrupt can be temporarily ignored by the counter is called

(1) Vectored interrupt

(2) Non-maskable interrupt

(3) Maskable interrupt

(4) Low priority interrupt

110. An op code

(1) Translates a mnemonic     (2) Instructs the CPU

(3) Stores data     (4) All of these

111. Which of the following cycle is required to fetch and execute information ?

(1) Clock cycle     (2) TRI cycle

(3) Instruction cycle     (4) Memory cycle

112. An instruction used to set the carry flag in a computer can be classified as

(1) Data transfer     (2) Process control

(3) Logical     (4) Program control

113. Which of the following addressing modes permits relocation without any change whatsoever in the code ?

(1) Indirect addressing

(2) Indexed addressing

(3) Base register addressing

(4) PC relative addressing

114. Which of the following requires a device driver ?

(1) Register             (2) Cache

(3) Main memory      (4) Disk

115. CPU has two modes— privileged and non-privileged. In order to change the mode from privileged to non-privileged

(1) a hardware interrupt is needed

(2) a software interrupt is needed

(3) a non-privileged instruction is needed

(4) a privileged instruction is needed

116. A computer uses trinary system instead of the traditional binary system. An $n$ bit string in the binary system will occupy

(1) $n \log_3 2$ trinary digits

(2) $3 + n$ trinary digits

(3) $2n/3$ trinary digits

(4) $n \log_2 3$ trinary digits

117. The addressing mode used in an instruction of the form ADD X, Y, is

    (1) Absolute                    (2) Immediate
    (3) Indirect                    (4) Index

118. Use of recursion

    (1) Enhances logical clarity

    (2) Reduces code size

    (3) Reduces execution time

    (4) Both (1) and (2)

119. In which of the following cases, is it possible to obtain different results
    for call-by-reference and call-by-name parameter passing ?

    (1) Passing an expression as a parameter

    (2) Passing an array as a parameter

    (3) Passing a pointer as a parameter

    (4) Passing an array element as a parameter

120. Vernacular languages (like English) and programming languages have
    a lot of similarities. In a broad sense, the nouns and verbs are comparable
    to

    (1) Operators and identifiers respectively

    (2) Operands and identifiers respectively

    (3) Operands and operators respectively

    (4) Operators and functions respectively

121. Which of the following strings can definitely be said to be tokens without looking at the next input character while compiling a Pascal program

I begin    II program    III < >

(1) I only           (2) II only

(3) III only         (4) All of the above

122. What is the output of the following 'C' program ?

```
main ( )
{
printf ( "\n%d%d%d", size of ( "3), size of ( "3"), size of (3));
```

(1) 111      (2) 222      (3) 123      (4) 122

123. What is the output of the following 'C' program ?

```
main ( )
{
unsigned char i = 0 x 80 ;
printf ( "\n%d", i ≪ 1);
```

(1) 0      (2) 256      (3) 100      (4) 500

124. What is the output of the following program fragment (in C) ?

```
int x, y = 2, z, a ;
x = (y * = 2) + (z = a = y) ;
printf ( "%d", x) ;
```

(1) 7      (2) 6      (3) 8      (4) 10

     *( Continued )*

125. Which of the following operators in 'C' does not associate from the left ?

(1) +             (2) ,             (3) =             (4) %

126. The statement, printf ( "%d ", $(a ++)$ ;

        prints

(1) The current value of $a$         (2) The value of $a + 1$
(3) An error message             (4) Garbage

127. In C programming language $x - = y + 1$ ; means

(1) $x = x - y + 1$             (2) $x = - x - y - 1$
(3) $x = - x + y + 1$             (4) $x = x - y - 1$

128. Arrays can be initialized provided they are

(1) Automatic             (2) External
(3) Static             (4) Both (2) and (3)

129. Recursive function are executed in a

(1) Last in first out order         (2) First in first out order
(3) Parallel fashion             (4) All of the above

130. What is the final value of sum ?

```
main ( )
{
int sum = 1 ;
for (; sum <= 9 ;)
printf ( "%d/n ", ++ sum) ;
```

(1) 9             (2) 8             (3) 10             (4) 15

131. Suppose *i, j, k* are integer variable with values 1, 2, 3 respectively. What is the value of the expression

$$!((j+k)>(i+5))\ ?$$

(1) 3      (2) 5      (3) 6      (4) 1

132. Which one of the following is correct ?

(1) Constructors return values

(2) Constructors can't be overloaded

(3) Destructors do not have return values

(4) There can be any number of constructors and destructors.

133. Template classes that have already been written to perform common class tasks are called

(1) Container classes      (2) Receptacle classes

(3) .Repository classes      (4) Alembic classes

134. Visibility mode by default is

(1) Public      (2) Private      (3) Protected      (4) Anywhere

135. Polymorphism is done by

(1) Function overloading

(2) Creating new classes from base class

(3) Operator overloading

(4) Both (1) and (3)

     (*Continued*)

136. Which of the following language support garbage collection ?

(1) Java      (2) C++      (3) C      (4) Small talk

137. The preliminary evaluation of a top-down design before programs are written is referred to as a

(1) Structured walk through

(2) Formal design review

(3) Informal design review

(4) Scheduled review

138. What is the name of the primary programming languages which is used in artificial intelligence research and hence for developing expert systems and fifth generation computers ?

(1) RPG      (2) PROLOG      (3) FORTRAN      (4) C++

139. The use of a computer to get information from data bank is called

(1) Information withdrawal

(2) Computer simulation

(3) Information retrieval

(4) Full-text searching

140. A factor in the selection of a source language is

(1) Programmer skill

(2) Language availability

(3) Program compatibility with other software

(4) All of the above

141. The person communicating with the manager to identifying information needs is the

   (1) Executive vice president

   (2) System analysts

   (3) Vice president of information systems

   (4) Programmer

142. Managers who are potential users of the MIS

   (1) Describe information needs

   (2) Identify alternative equipment configuration

   (3) Evaluate alternative equipment configuration

   (4) Select the optimum equipment configuration

143. AI systems that use neuron structures to recognize patterns in data, is

   (1) Fuzzy logic

   (2) Neural network

   (3) Intelligent agent

   (4) Genetic algorithms

144. Using computers to steal money, service software or data is called

   (1) Computer crime

   (2) Computer laws

   (3) Software piracy

   (4) Hacking

145. A simulation program

   (1) Guides novices through the basics of using other computer programs

   (2) Teaches facts, such as arithmetic operations and spelling

   (3) Teaches by emulating the responses of the system being studied

   (4) All of the above

146. The maximum effort distribution in phases of software development is

   (1) Requirement analysis      (2) Design phase

   (3) Coding      (4) Testing

147. What is cluster ?

   (1) Group of files

   (2) A type of number system

   (3) Group of sectors used in DOS

   (4) Group of sectors used in UNIX

148. In a magnetic tape, 25 records are grouped together, what is the blocking factor ?

   (1) 25/2      (2) 25      (3) 25 × 2      (4) 100

149. Booting the computer means

   (1) Logging in

   (2) Loading the resident part of the operating system into memory

   (3) Turning the computer on

   (4) Both (1) and (2)

150. In computer jargon, wetware means

   (1) Human intelligence

   (2) Any organic intelligence

   (3) Artificial intelligence

   (4) High intelligence

# अभ्यर्थियों के लिए निर्देश

(इस पुस्तिका के प्रथम आवरण-पृष्ठ पर तथा उत्तर-पत्र के दोनों पृष्ठों पर केवल *नीली-काली वाल-प्वाइंट पेन से ही लिखें*)

1. प्रश्न पुस्तिका मिलने के 10 मिनट के अन्दर ही देख लें कि प्रश्नपत्र में सभी पृष्ठ मौजूद हैं और कोई प्रश्न छूटा नहीं है। पुस्तिका दोषयुक्त पाये जाने पर इसकी सूचना तत्काल कक्ष-निरीक्षक को देकर सम्पूर्ण प्रश्नपत्र की दूसरी पुस्तिका प्राप्त कर लें।

2. परीक्षा भवन में *लिफाफा रहित प्रवेश-पत्र के अतिरिक्त*, लिखा या सादा कोई भी खुला कागज साथ में न लायें।

3. उत्तर-पत्र अलग से दिया गया है। *इसे न तो मोड़ें और न ही विकृत करें। दूसरा उत्तर-पत्र नहीं दिया जायेगा। केवल उत्तर-पत्र का ही मूल्यांकन किया जायेगा।*

4. अपना *अनुक्रमांक तथा उत्तर-पत्र का क्रमांक प्रथम आवरण-पृष्ठ पर पेन से* निर्धारित स्थान पर लिखें।

5. *उत्तर-पत्र के प्रथम पृष्ठ पर पेन से अपना अनुक्रमांक निर्धारित स्थान पर लिखें तथा नीचे दिये वृत्तों को गाढ़ा कर दें। जहाँ-जहाँ आवश्यक हो वहाँ प्रश्न-पुस्तिका का क्रमांक तथा सेट का नम्बर उचित स्थानों पर लिखें।*

6. ओ० एम० आर० पत्र पर अनुक्रमांक संख्या, प्रश्न-पुस्तिका संख्या व सेट संख्या (यदि कोई हो) तथा प्रश्न-पुस्तिका पर अनुक्रमांक सं० और ओ० एम० आर० पत्र संख्या की प्रविष्टियों में उपरिलेखन की अनुमति नहीं है।

7. उपर्युक्त प्रविष्टियों में कोई भी परिवर्तन कक्ष-निरीक्षक द्वारा प्रमाणित होना चाहिये अन्यथा यह एक अनुचित साधन का प्रयोग माना जायेगा।

8. प्रश्न-पुस्तिका में प्रत्येक प्रश्न के चार वैकल्पिक उत्तर दिये गये हैं। *प्रत्येक प्रश्न के वैकल्पिक उत्तर के लिये आपको उत्तर-पत्र की सम्बन्धित पंक्ति के सामने दिये गये वृत्त को उत्तर-पत्र के प्रथम पृष्ठ पर दिये गये निर्देशों के अनुसार पेन से गाढ़ा करना है।*

9. प्रत्येक प्रश्न के उत्तर के लिये केवल एक ही वृत्त को गाढ़ा करें। एक से अधिक वृत्तों को गाढ़ा करने पर अथवा एक वृत्त को अपूर्ण भरने पर वह उत्तर गलत माना जायेगा।

10. *ध्यान दें कि एक बार स्याही द्वारा अंकित उत्तर बदला नहीं जा सकता है। यदि आप किसी प्रश्न का उत्तर नहीं देना चाहते हैं*, तो सम्बन्धित पंक्ति के सामने दिये गये सभी वृत्तों को खाली छोड़ दें। ऐसे प्रश्नों पर शून्य अंक दिये जायेंगे।

11 एफ कार्य के लिये इस-पुस्तिका के मुखपृष्ठ के अंदर वाला पृष्ठ तथा अंतिम खाली पृष्ठ का प्रयोग करें।

12. परीक्षा के उपरान्त *प्रश्न-पुस्तिका एवं उत्तर-पत्र* परीक्षा भवन में जमा कर दें।

13. परीक्षा समाप्त होने से पहले परीक्षा भवन से बाहर जाने की अनुमति नहीं होगी।

14. यदि कोई अभ्यर्थी परीक्षा में अनुचित साधनों का प्रयोग करता है, तो वह विश्वविद्यालय द्वारा निर्धारित दंड का/की भागी होगा / होगी।