Set No. 1

18P/208/21

Total No. of Printed Pages : 28

Question Booklet No..... 79

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

Roll No. | | | | | | | | | | |

Roll No. *(Write the digits in words)* 2018

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

Centre Code No. | | | | |

.....

Day and Date ..... (Signature of Invigilator)

INSTRUCTIONS TO CANDIDATES

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

1. Within 30 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.*
3. A separate OMR Answer Sheet is given. *It should not be folded or mutilated. A second OMR Answer Sheet shall not be provided. Only the OMR Answer Sheet will be evaluated.*
4. Write all the entries by blue/black ball pen in the space provided above.
5. **On the front page of the OMR Answer Sheet, write by pen your Roll Number in the space provided at the top, and by darkening the circles at the bottom. Also, write the Question Booklet Number, Centre Code Number and the Set Number (wherever applicable) in appropriate places.**
6. No overwriting is allowed in the entries of Roll No., Question Booklet No. and Set No. (if any) on OMR Answer Sheet and also Roll No. and OMR Answer Sheet Serial No. on the Question Booklet.
7. Any change 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 OMR Answer Sheet by darkening the appropriate circle* in the corresponding row of the OMR Answer Sheet, by ball-point pen as mentioned in the guidelines given on the first page of the OMR Answer Sheet.
9. For each question, darken only one circle on the OMR 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 mark).
11. For rough work, use the inner back page of the title cover and the blank page at the end of this Booklet.
12. On completion of the Test, the Candidate must handover the OMR Answer Sheet to the Invigilator in the examination room/hall. However, candidates are allowed to take away Text Booklet and copy of OMR Answer Sheet with them.
13. Candidates 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.

यह निर्देश हिन्दी में अन्तिम आवरण-पृष्ठ पर दिये गए हैं।

SPACE FOR ROUGH WORK

रफ़ कार्य के लिए जगह

18P/208/21 Set No. 1

No. of Questions : 120

Time : 2 Hours **Full Marks :** 360

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

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

1. Power set of empty set has exactly —— subset.

(1) zero (2) one (3) two (4) three

2. The truth table for $(p \vee q) \vee (p \wedge r)$ is the same as the truth table for

(1) $(p \vee q) \wedge (p \vee r)$ (2) $(p \vee q) \wedge r$

(3) $(p \vee q) \wedge (p \wedge r)$ (4) $p \vee q$

3. For a complete graph with N vertices, the total number of spanning trees is given by

(1) $2N - 1$ (2) $N^{(N-1)}$ (3) $N^{(N-2)}$ (4) $2N + 1$

4. Consider the statement, "Either $-2 \leq x \leq -1$ or $1 \leq x \leq 2$". The negation of this statement is

(1) $x < -2$ or $2 < x$ (2) $-1 < x < 1$

(3) $-2 < x < 2$ (4) $x \leq -2$ or $2 \leq x$ or $-1 < x < 1$

5. Consider the following matrix $A = \begin{bmatrix} 2 & 3 \\ x & y \end{bmatrix}$. If the eigenvalues of A are 4 and 8, then

(1) $x = -4, y = 10$ (2) $x = 5, y = 8$

(3) $x = -3, y = 9$ (4) $x = 4, y = 10$

6. The convergence of which one of the following method is sensitive to starting value

(1) Newton-Raphson method (2) Gauss-Scidal method

(3) False position (4) All of the above

7. How many licence plate can be formed from 3 English letters followed by 3 digits?

(1) $26^3 * 10^2$ (2) $26^2 * 10^3$ (3) $26^3 * 10^3$ (4) $26^2 * 10^2$

8. How many integers from 100 to 999 are divisible by 7?

(1) 112 (2) 115 (3) 126 (4) 128

9. Data about data is termed as

(1) directory (2) root (3) meta data (4) data bank

10. Which one of the following is true?

(1) Every relation in 3NF is also in BCNF

(2) No relation can be in both BCNF and 3NF

(3) Every relation in BCNF is also in 3NF

(4) A relation R is in 3NF if every non-prime attribute of R is fully functionally dependent on every key of R

11. Consider a schema $R(A, B, C, D)$ and functional dependencies $A -> B$ and $C -> D$. Then the decomposition of R into $R1(AB)$ and $R2(CD)$ is

(1) dependency preserving and lossless join

(2) dependency preserving but not lossless join

(3) lossless join but not dependency preserving

(4) not dependency preserving and not lossless join

12. —— ensures that once transaction changes are done, they cannot be undone or lost, even in the event of a system failure.

(1) Atomicity (2) Durability (3) Isolation (4) Consistency

13. When a transaction is abnormally terminated, the equivalent of a —— command occurs?

(1) QUIT (2) EXIT (3) COMMIT (4) ROLLBACK

14. Deadlocks are possible only when at least one of the transactions wants to obtain a(n) —— lock on a data item.

(1) partial (2) shared (3) exclusive (4) binary

15. If there is more than one key for relation schema in DBMS, then each key in relation schema is classified as

(1) candidate key
(2) primary key
(3) super key
(4) composite key

16. What type of join is needed when you wish to include rows that do not have matching values?

(1) Cross-join (2) Inner-join (3) Outer-join (4) Equi-join

17. Which one of the following is true about PL/SQL cursors?

(1) Explicit cursors are automatically created by Oracle.

(2) Implicit cursors are programmer defined cursors.

(3) The most recent implicit cursor is called the SQL cursor, and has the attributes like %FOUND, %ISOPEN, %NOTFOUND and %ROWCOUNT

(4) All of the above

18. Given relations r(w, x) and s(y, z), the result of SELECT DISTINCT *w, x* FROM r, s is guaranteed to be same as r, provided

(1) s has no duplicates and r is non-empty

(2) r and s have the same number of tuples

(3) r has no duplicates and s is non-empty

(4) r and s have no duplicates

19. What are the time complexities of finding 10th element from beginning and 10th element from end in a singly linked list? Let n be the number of nodes in linked list, you may assume that n > 10.

(1) O(n) and O(1)
(2) O(n) and O(n)
(3) O(1) and O(n)
(4) O(1) and O(1)

20. Several factors that affect the efficiency of lockup operations in a hash table are stated. Which one of the following is not one of those factors?

(1) Number of elements stored in the hash table

(2) Size of elements stored in the hash table

(3) Number of buckets in the hash table

(4) Quality of the hash function

21. What is the infix expression of the following postfix expression?

$$x\ 12 + z\ 17\ y + 42 * / +$$

(1) x + 12 + z / ((17 + y) * 42)

(2) x + 12 + z / (17 + y) * 42

(3) x + (12 + z) / (17 + y * 42)

(4) (x + 12 + z) / (17 + y * 42)

22. Consider a situation where you don't have function to calculate power (pow( ) function in C) and you need to calculate x^n, where x can be any number and n is a positive integer. What can be the best possible time complexity of your power function?

(1) O(n) (2) O(log log n) (3) O(n log n) (4) O(log n)

23. The upper bound on the time complexity of the nondeterministic sorting algorithm is

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

24. Consider a situation where swap operation is very costly. Which of the following sorting algorithms should be preferred so that the number of swap operations is minimized in general?

(1) Heap sort

(2) Merge sort

(3) Insertion sort

(4) Selection sort

25. Which is better computing time for analyzing an algorithm in the given options?

(1) $O(N \log N)$ (2) $O(100 \log N)$

(3) $O(2^N)$ (4) $O(N)$

26. The given array is arr = {1,2,4,3} . Bubble sort is used to sort the array elements. How many iterations will be done to sort the array with improvised version?

(1) 4 (2) 1 (3) 0 (4) 2

27. Given an undirected graph G with V vertices and E edges, the sum of the degrees of all vertices is

(1) E (2) 2E (3) V (4) 2V

28. What is the minimum number of gates required to implement the Boolean function $(AB + C)$ if we have to use only 2-input NOR gates?

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

29. How many 3-to-8 line decoders with an enable input are needed to construct a 6-to-64 line decoder without using any other logic gates?

(1) 7 (2) 8 (3) 9 (4) 10

30. In an SR latch made by cross-coupling two NAND gates, if both S and R inputs are set to 0, then it will result in

(1) $Q = 0, Q' = 1$ (2) $Q = 1, Q' = 0$

(3) $Q = 1, Q' = 1$ (4) indeterminate states

31. Given the following K-map, which one of the following represents the minimal SOP of the map?

		wx			
		00	01	11	10
yz	00	0	x	0	x
	01	x	1	x	1
	11	0	x	1	0
	10	0	1	x	0

(1) $xy + y'z$

(2) $wx'y' + xy + xz$

(3) $w'x + y'z + xy$

(4) $xz + y$

32. Consider a 4 bit Johnson counter with an initial value of 0000. The counting sequence of this counter is

(1) 0, 1, 3, 7, 15, 14, 12, 8, 0

(2) 0, 1, 3, 5, 7, 9, 11, 13, 15, 0

(3) 0, 2, 4, 6, 8, 10, 12, 14, 0

(4) 0, 8, 12, 14, 15, 7, 3, 1, 0

33. Given $\sqrt{(224)_r} = (13)_r$. The value of the radix r is

(1) 10 (2) 8 (3) 5 (4) 6

34. Computers use addressing mode techniques for

(1) giving programming versatility to the user by providing facilities as pointer to memory counters for loop control

(2) to reduce no. of bits in the field of instruction

(3) specifying rules for modifying or interpreting address field of the instruction

(4) All of the above

35. A computer has a 256 KByte, 4-way set associative, write back data cache with block size of 32 Bytes. The processor sends 32 bit addresses to the cache controller. Each cache tag directory entry contains, in addition to address tag, 2 *valid bits*, 1 *modified* bit and 1 replacement bit. The number of bits in the tag field of an address is

(1) 11 (2) 14 (3) 16 (4) 27

36. The extra time needed to bring the data into memory in case of a miss is called as

(1) delay (2) propagation time

(3) miss penalty (4) none of the mentioned

37. The return address from the interrupt-service routine is stored on the

(1) system heap (2) processor register

(3) processor stack (4) memory

38. The time taken to switch between user and kernel modes of execution be t1 while the time taken to switch between two processes be t2. Which one of the following is TRUE?

(1) $t1 > t2$

(2) $t1 = t2$

(3) $t1 < t2$

(4) nothing can be said about the relation between t1 and t2

39. A process executes the code

```
fork( );
fork( );
fork( );
fork( );
```

The total number of child processes created is

(1) 8 (2) 7 (3) 16 (4) 15

40. Which one of the following does not interrupt a running process?

(1) A device (2) Timer

(3) Scheduler process (4) Power failure

41. Consider three CPU-intensive processes, which require 10, 20 and 30 time units and arrive at times 0, 2 and 6 respectively. How many context switches are needed if the operating system implements a shortest remaining time first scheduling algorithm? Do not count the context switches at time zero and at the end?

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

42. A system contains four programs and each requires four tape units for its operation. The minimum number of tape units which the system must have such that deadlocks never arise is

(1) 12 (2) 13 (3) 14 (4) 16

43. A counting semaphore was initialized to 10. Then 6 P operations and 4 V operations were completed on this semaphore. The resulting value of the semaphore is

(1) 0 (2) 8 (3) 9 (4) 10

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

(1) FIFO (2) LRU

(3) Optimal page replacement (4) Both LRU and FIFO

45. A system uses FIFO policy for page replacement. It has 4 page frames with no pages loaded to begin with. The system first accesses 100 distinct pages in some order and then accesses the same 100 pages but now in the reverse order. How many page faults will occur?

(1) 192 (2) 100 (3) 196 (4) 200

46. A 1000 Kbyte memory is managed using variable partitions but no compaction. It currently has two partitions of sizes 200 Kbyte and 260 Kbytes respectively. The smallest allocation request in Kbytes that could be denied is for

(1) 151 (2) 181 (3) 231 (4) 541

47. Consider a disk pack with 16 surfaces, 128 tracks per surface and 256 sectors per track. 512 bytes of data are stored in a bit serial manner in a sector. The capacity of the disk pack and the number of bits required to specify a particular sector in the disk are respectively

(1) 64 Gb, 28 bits (2) 512 Mb, 20 bits

(3) 256 Mb, 28 bits (4) 256 Mb, 19 bits

48. Communication between a computer and a keyboard involves ——— transmission

(1) automatic (2) half-duplex

(3) full-duplex (4) simplex

49. A ——— is a device that forwards packets between networks by processing the routing information included in the packet.

(1) Bridge
(2) Firewall
(3) Router
(4) All of the mentioned

50. Network congestion occurs

(1) in case of traffic overloading
(2) when a system terminates
(3) when connection between two nodes terminates
(4) None of the mentioned

51. Bits can be send over guided and unguided media as analog signal by

(1) digital modulation
(2) amplitude modulation
(3) frequency modulation
(4) phase modulation

52. Which one of the following task is not done by data link layer?

(1) Framing
(2) Error control
(3) Flow control
(4) Channel coding

53. The packet of information at the application layer is called

(1) packet
(2) message
(3) segment
(4) frame

54. Electronic mail uses this application layer protocol

(1) SMTP
(2) HTTP
(3) FTP
(4) SIP

55. The function of physical layer is

(1) error correction and detection

(2) piggybacking

(3) flow control

(4) determine number of volts to represent 1 or 0

56. A half byte is known as

(1) data (2) bit (3) nibble (4) variable

57. What is the results of the programme?

```
#include <stdio.h>
int main( )
{
        printf("Hello World! %d \n", x);
        return 0;
}
```

(1) Hello World! x;

(2) Hello World! followed by a junk value

(3) Compile time error

(4) Hello World!

58. The scope of an automatic variable is

(1) within the block it appears

(2) within the blocks of the block it appears

(3) until the end of program

(4) Both (1) and (2)

59. What would be the equivalent pointer expression for referring the array element a[i][j][k][l]?

(1) ((((a + i) + j) + k) + 1)

(2) *(*(*(*(a + i) + j) + k) + 1)

(3) (((a + i) + j) + k + 1)

(4) ((a + i) + j + k + 1)

60. What is the similarity between a structure, union and enumeration?

(1) All of them let you define new values

(2) All of them let you define new data types

(3) All of them let you define new pointers

(4) All of them let you define new structures

61. What will be the output of the program?

```
#include<stdio.h>
int main( )
{
        enum days {MON = -1, TUE, WED = 6, THU, FRI, SAT};
        printf("%d, %d, %d, %d, %d, %d\n", MON, TUE, WED, THU, FRI, SAT);
        return 0;
}
```

(1) -1, 0, 1, 2, 3, 4

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

(3) -1, 0, 6, 2, 3, 4

(4) -1, 0, 6, 7, 8, 9

62. How would you round off a value from 1.66 to 2.0?

(1) ceil(1.66)

(2) floor(1.66)

(3) round(1.66)

(4) roundto(1.66)

63. What about the following statement?

```
extern int i;
```

(1) Declaration (2) Definition (3) Function (4) Error

64. How many times the program will print "C Programming" ?

```
#include<stdio.h>
int main( )
{
    printf("C Programming");
    main( );
    return 0;
}
```

(1) Infinite times (2) 32767 times

(3) 65535 times (4) Till stack overflows

65. The Newton-Raphson method is used to find the root of the equation $x - 2 = 0$

(1) converge to -1 (2) converge to $\sqrt{2}$

(3) converge to $-\sqrt{2}$ (4) not converge

66. A graph consisting of only isolated n vertices is

(1) 1-chromatic (2) 2-chromatic (3) 3-chromatic (4) n-chromatic

67. A subnet has been assigned a subnet mask of 255.255.255.192. What is t maximum number of hosts that can belong to this subnet?

(1) 14 (2) 30 (3) 62 (4) 126

68. Which one of the following statements is FALSE regarding a bridge?

(1) Bridge is a layer 2 device

(2) Bridge reduces collision domain

(3) Bridge is used to connect two or more LAN segments

(4) Bridge reduces broadcast domain

69. Which one of the following statements is TRUE about CSMA/CD?

(1) IEEE 802.11 wireless LAN runs CSMA/CD protocol

(2) Ethernet is not based on CSMA/CD protocol

(3) CSMA/CD is not suitable for a high propagation delay network like satellite network

(4) There is no contention in a CSMA/CD network

70. The minimum number of page frames that must be allocated to a running process in a virtual memory environment is determined by

(1) the instruction set architecture (2) page size

(3) physical memory size (4) number of processes in memory

71. A Priority-Queue is implemented as a Max-Heap. Initially, it has 5 elements. The level-order traversal of the heap is given below

10, 8, 5, 3, 2

Two new elements 1 and 7 are inserted in the heap in that order. The level-order traversal of the heap after the insertion of the elements is

(1) 10,8,7,5,3,2,1 (2) 10,8,7,2,3,1,5

(3) 10,8,7,1,2,3,5 (4) 10,8,7,3,2,1,5

72. The following numbers are inserted into an empty binary search tree in the given order

10, 1, 3, 5, 15, 12, 16

What is the height of the binary search tree (the height is the maximum distance of a leaf node from the root)?

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

73. The minimum number of 2-input NAND gates required to implement the function $F = (X' + Y')(Z + W)$ is

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

74. How many pulses are needed to change the contents of a 8-bit up counter from 10101100 to 00100111 (rightmost bit is the LSB)?

(1) 134 (2) 133 (3) 124 (4) 123

75. The address sequence generated by tracing a particular program executing in a pure demand paging system with 100 records per page, with a free main memory frame is recorded as follows. What is the number of page faults?

0100, 0200, 0430, 0499, 0510, 0530, 0560, 0120, 0220, 0240, 0260, 0320, 0370

(1) 13 (2) 8 (3) 7 (4) 10

76. Consider the join of a relation R with a relation S. If R has m tuples and has n tuples, then the maximum and minimum sizes of the join respectively are

(1) $m + n$ and 0

(2) mn and 0

(3) $m + n$ and $m - n$

(4) mn and $m + n$

77. What is the minimum number of two-input NAND gates used to perform the function of two input OR gate?

(1) One (2) Two (3) Three (4) Four

78. The D-flip-flop captures the value of the input D when there is a

(1) positive edge (2) rising edge

(3) negative edge (4) non-rising edge

79. The scheduling policy that has long waiting times for small processes is

(1) SJF (2) round robin (3) FCFS (4) FJS

80. The most important schema for application programmers is

(1) physical schema (2) logical schema

(3) conceptual schema (4) external schema

81. Which one of the following is the tightest upper bound that represents the time complexity of inserting an object into a binary search tree of n nodes?

(1) O(1) (2) O(log n) (3) O(n) (4) O(n log n)

82. The preorder traversal sequence of a binary search tree is 30, 20, 10, 15, 25, 23, 39, 35, 42. Which one of the following is the postorder traversal sequence of the same tree?

(1) 10,20,15,23,25,35,42,39,30 (2) 15,10,25,23,20,42,35,39,30

(3) 15,20,10,23,25,42,35,39,30 (4) 15,10,23,25,20,35,42,39,30

83. The simplified SOP (Sum of Product) form of the Boolean expression $(P + Q' + R')$; $(P + Q' + R)$; $(P + Q + R')$ is

(1) $(P'.Q + R')$ (2) $(P + Q'.R')$ (3) $(P'.Q + R)$ (4) $(P.Q + R)$

84. Given the basic ER and relational models, which one of the following is *INCORRECT*?

(1) An attribute of an entity can have more than one value

(2) An attribute of an entity can be composite

(3) In a row of a relational table, an attribute can have more than one value

(4) In a row of a relational table, an attribute can have exactly one value or a NULL value

85. In 'C' programming, if an array is used as a function argument, the array is passed

(1) by value

(2) by reference

(3) none of these as array cannot be used as function argument

(4) call by name

86. In a memory-mapped I/O system, which one of the following will not be there?

(1) LDA (2) IN (3) ADD (4) OUT

87. The instructions which copy information from one location to another either in the processor's internal register set or in the external main memory are called

(1) data transfer instructions (2) program control instructions

(3) input-output instructions (4) logical instructions

88. Inheritance makes it easier to

(1) reuse and modify existing modules of code

(2) write and read code by sharing method names

(3) hide and protect data from external code

(4) Both (1) and (2)

89. In tuple relational calculus $P_1 \rightarrow P_2$ is equivalent to

(1) $\neg P_1 \vee P_2$ (2) $P_1 \vee P_2$ (3) $P_1 \wedge P_2$ (4) $P_1 \wedge \neg P_2$

90. Initial value of the semaphore that allows only one of the many processes to enter their critical section is

(1) 8 (2) 1 (3) 16 (4) 0

91. In SQL the statement select * from R, S is equivalent to

(1) select * from R natural join S (2) select * from R cross join S

(3) select * from R union join S (4) select * from R inner join S

92. Controlling redundancy in a database management system DOES NOT help to

(1) avoid duplication

(2) avoid unnecessary wastage of storage space

(3) avoid unauthorised access to data

(4) avoid inconsistency among data

93. Relational calculus is a

(1) procedural language (2) non-procedural language

(3) data definition language (4) high level language

94. A relation $R(X, Y, Z, W)$ with functional dependencies $XZ \rightarrow W, YZ \rightarrow W, X \rightarrow Y$ and $Y \rightarrow X$ is in

(1) 1 NF only (2) 2 NF only (3) 3 NF only (4) BCNF

95. Which one of the following is not a broadband communication medium?

(1) Microwave (2) Fibre optic cable

(3) Twisted pair (4) Coaxial cable

96. Given two sorted list of size m and n respectively. The number of comparisons needed in the worst case by the merge sort algorithm will be

(1) $m \times n$ (2) maximum of m, n

(3) minimum of m, n (4) $m + n - 1$

97. Part of program where the shared memory is accessed and which should be executed indivisibly, is called

(1) semaphores (2) directory

(3) critical section (4) mutual exclusion

98. Maximum possible height of an AVL tree with 7 nodes is

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

99. In which of the storage placement strategies a program is placed in the smallest hole in the main memory in which it will fit?

(1) Best fit (2) First fit (3) Worst fit (4) Buddy

100. Page fault occurs when

(1) the page is corrupted by application software

(2) the page is in main memory

(3) the page is not in main memory

(4) one tries to divide a number by 0

101. A network with bandwidth of 10 Mbps can pass only an average of 15000 frames per minute with each frame carrying an average of 8000 bits. What is the throughput of this network?

(1) 2 Mbps (2) 60 Mbps (3) 120 Mbps (4) 10 Mbps

102. If there are n integers to sort, each integer has d digits and each digit is in the set $\{1,2,\cdots,k\}$, radix sort can sort the numbers in

(1) $O(d\,n\,k)$ (2) $O(d\,n^k)$ (3) $O((d+n)k)$ (4) $O(d(n+k))$

103. In propositional logic, given P and $P \rightarrow Q$, we can infer

(1) $\sim Q$ (2) Q (3) $P \wedge Q$ (4) $\sim P \wedge Q$

104. The number of 1's present in the binary representation of $10 \times 256 + 5 \times 16 + 5$ is

(1) 5 (2) 6 (3) 7 (4) 8

105. 8-bit 1's complement form of $-77 \cdot 25$ is

(1) 01001101.0100 (2) 01001101.0010

(3) 10110010.1011 (4) 10110010.1101

106. The number of different trees with 8 nodes is

(1) 256 (2) 255 (3) 248 (4) 250

107. Multi-valued dependency among attribute is checked at which level?

(1) 2 NF (2) 3 NF (3) 4 NF (4) 5 NF

108. An example of a tautology is

(1) $x \vee y$ (2) $x \vee (\sim y)$

(3) $x \vee (\sim x)$ (4) $(x \Rightarrow y) \wedge (x \leq y)$

109. A program has five virtual pages, numbered from 0 to 4. If the pages are referenced in the order 012301401234, with three page frames, the total number of page faults with FIFO will be equal to

(1) 0 (2) 4 (3) 6 (4) 9

110. The following loop in 'C'

```
int i = 0;
while (i++ < 0)
i--;
```

(1) will terminate (2) will go into an infinite loop

(3) will give compilation error (4) will never be executed

111. The memory allocation scheme subjected to "external" fragmentation is

(1) segmentation (2) swapping

(3) demand paging (4) multiple contiguous fixed partition

112. A trigger is

(1) a statement that enables to start any DBMS

(2) a statement that is executed by the user when debugging an application program

(3) a condition the system tests for the validity of the database user

(4) a statement that is executed automatically by the system as a side effect of modification to the database

113. The algorithm, which may suffer from cascading roll back, is

(1) 2 phase locking protocol (2) strictly two phase locking protocol

(3) strictly two phase (4) time stamp ordering protocol

114. Which one of the following sorting algorithm has almost the same worst case and best case complexity?

(1) Quick sort (2) Merge sort (3) Heap sort (4) Shell sort

115. In an empty circular queue, the front and rear are

(1) $-1, -1$ (2) 0, 0 (3) 0, 1 (4) 1, 1

116. A digital signature is used to provide security makes use of

(1) digitally scanned signature

(2) a unique ASCII code number of the sender

(3) private key encryption

(4) public key encryption

117. The address of a class B host is to be split into subnets with a 6-bit subnet number. What is the maximum number of subnets and the maximum number of hosts in each subnet?

(1) 62 subnets and 262142 hosts
(2) 64 subnets and 262142 hosts
(3) 62 subnets and 1022 hosts
(4) 64 subnets and 1024 hosts

118. A relation over the set $S = \{x, y, z\}$ is defined by

$$\{(x,x), (x,y), (y,x), (x,z), (y,z), (y,y), (z,z)\}$$

what properties hold for this relation?

(I) Symmetric
(II) Reflexive
(III) Antisymmetric
(IV) Irreflexive

(1) (I) only
(2) (II) only
(3) (I) and (II) only
(4) (I) and (IV) only

119. Which one of the following DMA transfer modes and interrupt handling mechanisms will enable the highest I/O band-width?

(1) Transparent DMA and polling interrupts
(2) Cycle-stealing and vectored interrupts
(3) Block transfer and vectored interrupts
(4) Block transfer and polling interrupts

120. The number of tokens in the following 'C' statement is

```
printf("i = %d, &i = %x", i, &i);
```

(1) 3
(2) 26
(3) 21
(4) 10

★★★

SPACE FOR ROUGH WORK

रफ़ कार्य के लिए जगह

अभ्यर्थियों के लिए निर्देश

(इस पुस्तिका के प्रथम आवरण-पृष्ठ पर तथा ओ०एम०आर० उत्तर-पत्र के दोनों पृष्ठों पर केवल नीली/काली बाल-प्वाइंट पेन से ही लिखें)

1. प्रश्न-पुस्तिका मिलने के 30 मिनट के अन्दर ही देख लें कि प्रश्नपत्र में सभी पृष्ठ मौजूद हैं और कोई पृष्ठ या 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 *प्रवेश-पत्र के अतिरिक्त*, लिखा या सादा कोई भी खुला कागज साथ में न लायें।

3. ओ०एम०आर० उत्तर-पत्र अलग से दिया गया है। ***इसे न तो मोड़ें और न ही विकृत करें। दूसरा ओ०एम०आर० उत्तर-पत्र नहीं दिया जायेगा। केवल ओ०एम०आर० उत्तर-पत्र का ही मूल्यांकन किया जायेगा।***

4. सभी प्रविष्टियां प्रथम आवरण-पृष्ठ पर नीली/काली बाल पेन से निर्धारित स्थान पर लिखें।

5. **ओ०एम०आर० 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 एवं केन्द्र कोड नम्बर तथा सेट का नम्बर उचित स्थानों पर लिखें।**

6. ओ०एम०आर० उत्तर-पत्र पर अनुक्रमांक संख्या, प्रश्न-पुस्तिका संख्या व सेट संख्या (यदि कोई हो) तथा प्रश्न पुस्तिका पर अनुक्रमांक सं० और ओ०एम०आर० उत्तर-पत्र सं० 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 ओ०एम०आर० उत्तर-पत्र की सम्बन्धित पंक्ति के सामने दिये गये वृत्त को ओ०एम०आर० 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. रफ कार्य के लिये प्रश्न-पुस्तिका के मुखपृष्ठ के अन्दर वाले पृष्ठ तथा अंतिम पृष्ठ का प्रयोग करें।

12. परीक्षा की समाप्ति के बाद अभ्यर्थी अपना ओ०एम०आर० उत्तर-पत्र परीक्षा कक्ष/हाल में कक्ष निरीक्षक को सौंप दें। अभ्यर्थी अपने साथ प्रश्न-पुस्तिका तथा ओ०एम०आर० उत्तर-पत्र की प्रति ले जा सकते हैं।

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।