

**APTITUDE TEST FOR MSC COMPUTER SCIENCE
(FINAL)**

COMPUTER SCIENCE AND APPLICATIONS

1. Consider the following C program.

```
#include<stdio.h>
struct ournode {
char x, y, z;
};
int main() {
struct ournode q = {'1', '0', 'a' + 2};
struct ournode *p = &q;
printf("%c, %c", *((char*) q + 1), *((char*) q + 2));
return 0;
}
```

The output of this program is

- (A) 0, c
 - (B) 0, a + 2
 - (C) '0', 'a + 2'
 - (D) '0', 'c'
2. What is the expected output?

```
#include<stdio.h>
int main()
{
int a[] = {1, 2, 3, 4, 5, 6};
int *ptr = (int*) (&a+1);
printf("%d ", *(ptr-1) );
return 0;
}
```

- (A) 1
- (B) 2
- (C) 6
- (D) Runtime Error

3. What is the functionality of the following piece of code?

```
Public void function(Object item)
{
    Node temp=new Node(item, trail);
    if(isEmpty())
    {
        head.setNext(temp);
        temp.setNext(trail);
    }
    Else
    {
        Node cur=head.getNext();
        while(cur.getNext()!=trail)
        {
            cur=cur.getNext();
        }
        cur.setNext(temp);
    }
    size++;
}
```

- (A) Insert at the front end of the dequeue
- (B) Insert at the rear end of the dequeue
- (C) Fetch the element at the rear end of the dequeue
- (D) Fetch the element at the front end of the dequeue

4. What is the expected output?

```
#include <stdio.h>
#define EVEN 0
#define ODD 1
int main()
{
    int i = 3;
    switch (i & 1)
    {
        case EVEN: printf("Even");
            break;
        case ODD: printf("Odd");
            break;
        default: printf("Default");
    }
    return 0;
}
```

- (A) Even
- (B) Odd
- (C) Default
- (D) Compile-time error

5. What is the expected output?

```
#include<stdio.h>
int main()
{
    int n;
    for (n = 9; n!=0; n--)
        printf("n = %d", n--);
    return 0;
}
```

- (A) 9 7 5 3 1
- (B) 9 8 7 6 5 4 3 2 1
- (C) Infinite Loop
- (D) 9 7 5 3

6. What will be the output of the following 'C' code?

```
main ( )
{
    int x = 128;
    printf("\n%d", 1+x++);
}
```

- (A) 128
- (B) 129
- (C) 130
- (D) 131

7. Comment on the following statement.

```
n = 1;
printf("%d, %d", 3*n, n++);
```

- (A) Output will be 3, 2
- (B) Output will be 3, 1
- (C) Output will be 6, 1
- (D) Output is compiler dependent

8. Predict the output.

```
#include <stdio.h>
int main()
{
    float c = 5.0;
    printf("Temperature in Fahrenheit is %.2f", (9/5)*c + 32);
    return 0;
}
```

- (A) Temperature in Fahrenheit is 41.00
- (B) Temperature in Fahrenheit is 37.00
- (C) Temperature in Fahrenheit is 0.00
- (D) Compiler Error

9. Which of the following option is the correct representation of the following C statement?

$e = a * b + c / d * f;$

- (A) $e = (a * (b + (c / (d * f))));$
- (B) $e = ((a * b) + (c / (d * f)));$
- (C) $e = ((a * b) + ((c / d) * f));$
- (D) $e = (a * ((b + c) / d) * f);$

10. In C++, a member function can always access the data in

- (A) the class of which it is member
- (B) the object of which it is a member
- (C) the public part of its class
- (D) the private part of its class

11. Which of the following cannot be passed to a function in C++ ?

- (A) Constant
- (B) Structure
- (C) Array
- (D) Header file

12. The C++ function generates random numbers.

- (A) generate()
- (B) rand
- (C) randGen
- (D) srand

13. The mode tells C++ to open a file for input.

- (A) add::ios
- (B) in::file
- (C) ios::out
- (D) ios::in

14. What will be the output of the following C code on a 32-bit machine?

```
#include <stdio.h>
int main()
{
    int x =10000;
    double y =56;
    int*p =&x;
    double*q =&y;
    printf("p and q are %d and %d",sizeof(p),sizeof(q));
    return0;
}
```

- (A) p and q are 4 and 4
- (B) p and q are 4 and 8
- (C) compiler error
- (D) p and q are 2 and 8

15. Which of the following while clauses tells C++ to read the records in a data file until the end of the file is reached?

- (A) while (inFile.eof())
- (B) while (!ifstream.eof())
- (C) while (!inFile.eof())
- (D) while (!ifstream.fail())

16. Modules in C++ programs are

- (A) functions
- (B) procedures
- (C) subroutines
- (D) mini-programs

17. Which is correct with respect to the size of the data types?

- (A) char > int > float
- (B) int > char > float
- (C) char < int < double
- (D) double > char > int

18. What will be the output of the following C++ code?

```
#include <iostream>
using namespace std;
void addprint()
{
    static int s =1;
    s++;
    cout<< s;
}
int main()
{
    addprint();
    addprint();
    addprint();
    return0;
}
```

- (A) 234
- (B) 111
- (C) 123
- (D) 235

19. What will be the output of the following C++ code?

```
#include <stdio.h>
#include <stdlib.h>
int main ()
{
    int n, m;
    n =abs(23);
    m =abs(-11);
    printf("%d", n);
    printf("%d", m);
    return0;
}
```

- (A) 23-11
- (B) 1123
- (C) 2311
- (D) 4325

20. What will be the output of the following C++ code?

```
#include <stdio.h>
#include <stdlib.h>
int compareints(constvoid* a, constvoid* b)
{
    return(*(int*)a -*(int*)b );
}
int values[]={50, 20, 60, 40, 10, 30};
int main ()
{
    int* p;
    int key =40;
    qsort(values, 6, sizeof(int), compareints);
    p =(int*)bsearch(&key, values, 6, sizeof(int), compareints);
    if(p !=NULL)
        printf("%d\n", *p);
    return0;
}
```

- (A) 10
- (B) 20
- (C) 40
- (D) 30

21. Which of the following sorting algorithms can be used to sort a random linked list with minimum time complexity?

- (A) Insertion Sort
- (B) Quick Sort
- (C) Heap Sort
- (D) Merge Sort

22. In the worst case, the number of comparisons needed to search a singly linked list of length n for a given element is

- (A) $\log 2n$
- (B) $\frac{n}{2}$
- (C) $\log 2n-1$
- (D) n

23. Let T be a binary search tree with 15 nodes. The minimum and maximum possible heights of T are (Note: The height of a tree with a single node is 0.)
- (A) 4 and 15 respectively
 - (B) 3 and 14 respectively
 - (C) 4 and 14 respectively
 - (D) 3 and 15 respectively
24. Let G be a graph with n vertices and m edges. What is the tightest upper bound on the running time of Depth First Search on G , when G is represented as an adjacency matrix?
- (A) $\Theta(n)$
 - (B) $\Theta(n + m)$
 - (C) $\Theta(n^2)$
 - (D) $\Theta(m^2)$
25. Which of the following is true?
- (A) Shell sort's passes completely sort the elements before going on to the next-smallest gap while Comb sort's passes do not completely sort the elements
 - (B) Shell sort's passes do not completely sort the elements before going on to the next-smallest gap like in Comb sort
 - (C) Comb sort's passes completely sort the elements before going on to the next-smallest gap like in Shell sort
 - (D) Shell sort's passes do not completely sort the elements before going on to the next smallest gap while Comb sort's passes completely sort the elements
26. In a complete k -ary tree, every internal node has exactly k children or no child. The number of leaves in such a tree with n internal nodes is
- (A) nk
 - (B) $(n - 1)k + 1$
 - (C) $n(k - 1) + 1$
 - (D) $n(k - 1)$
27. The height of a binary tree is the maximum number of edges in any root to leaf path. The maximum number of nodes in a binary tree of height h is
- (A) $2^h - 1$
 - (B) $2^{(h - 1)} - 1$
 - (C) $2^{(h + 1)} - 1$
 - (D) $2^*(h + 1)$

28. Which of the following is **FALSE** about a doubly linked list?
- (A) We can navigate in both the directions
 - (B) It requires more space than a singly linked list
 - (C) The insertion and deletion of a node take a bit longer
 - (D) Implementing a doubly linked list is easier than singly linked list
29. What is the worst case time complexity of inserting a node in a doubly linked list?
- (A) $O(n \log n)$
 - (B) $O(\log n)$
 - (C) $O(n)$
 - (D) $O(1)$
30. What is a memory efficient double linked list?
- (A) Each node has only one pointer to traverse the list back and forth
 - (B) The list has breakpoints for faster traversal
 - (C) An auxiliary singly linked list acts as a helper list to traverse through the doubly linked list
 - (D) A doubly linked list that uses bitwise AND operator for storing addresses

31. Consider the following doubly linked list: head-1-2-3-4-5-tail

What will be the list after performing the given sequence of operations?

```
Node temp =newNode(6, head, head.getNext());
Node temp1 =newNode(0, tail.getPrev(), tail);
head.setNext(temp);
temp.getNext().setPrev(temp);
tail.setPrev(temp1);
temp1.getPrev().setNext(temp1);
```

- (A) head-0-1-2-3-4-5-6-tail
- (B) head-1-2-3-4-5-6-tail
- (C) head-6-1-2-3-4-5-0-tail
- (D) head-0-1-2-3-4-5-tail

32. What is the functionality of the following piece of code?

```
public int function()
{
    Node temp = tail.getPrev();
    tail.setPrev(temp.getPrev());
    temp.getPrev().setNext(tail);
    size--;
    return temp.getItem();
}
```

- (A) Return the element at the tail of the list but do not remove it
- (B) Return the element at the tail of the list and remove it from the list
- (C) Return the last but one element from the list but do not remove it
- (D) Return the last but one element at the tail of the list and remove it from the list

33. How many properties does a leftist heap support?

- (A) 1
- (B) 2
- (C) 3
- (D) 4

34. In a leftist heap, the null path length of a null node is defined as

- (A) 0
- (B) 1
- (C) Null
- (D) -1

35. What do the other nodes of an expression tree (except leaves) contain?

- (A) Only operands
- (B) Only operators
- (C) Both operands and operators
- (D) Expression

36. What is the worst case time complexity for search, insert and delete operations in a general Binary Search Tree?

- (A) $O(n)$ for all
- (B) $O(\log n)$ for all
- (C) $O(\log n)$ for search and insert, and $O(n)$ for delete
- (D) $O(\log n)$ for search, and $O(n)$ for insert and delete

37. Which of the following traversal outputs the data in sorted order in a BST?
- (A) Preorder
 - (B) Inorder
 - (C) Postorder
 - (D) Level order
38. A hash function h defined $h(\text{key}) = \text{key} \bmod 7$, with linear probing, is used to insert the keys 44, 45, 79, 55, 91, 18, 63 into a table indexed from 0 to 6. What will be the location of key 18?
- (A) 3
 - (B) 4
 - (C) 5
 - (D) 6
39. Let P is a quick sort program to sort numbers in ascending order using the first element as the pivot. Let t_1 and t_2 be the number of comparisons made by P for the inputs [1 2 3 4 5] and [4 1 5 3 2] respectively. Which one of the following holds?
- (A) $t_1 = 5$
 - (B) $t_1 < t_2$
 - (C) $t_1 > t_2$
 - (D) $t_1 = t_2$
40. Which of the following is **TRUE** about linked list implementation of stack?
- (A) In push operation, if new nodes are inserted at the beginning of linked list, then in pop operation, nodes must be removed from end
 - (B) In push operation, if new nodes are inserted at the end, then in pop operation, nodes must be removed from the beginning
 - (C) Both (A) and (B) are true
 - (D) None of the above
41. The following postfix expression with single digit operands is evaluated using a stack.

$$8 2 3 \wedge / 2 3 * + 5 1 * -$$

Note that \wedge is the exponentiation operator. The top two elements of the stack after the first $*$ is evaluated are

- (A) 6, 1
- (B) 5, 7
- (C) 3, 2
- (D) 1, 5

42. Consider a situation where a client receives packets from a server. There may be differences in speed of the client and the server. Which data structure is best suited for synchronization?

- (A) Circular Linked List
- (B) Queue
- (C) Stack
- (D) Priority Queue

43. $++a*bc*+defg$ is a/an

- (A) Postfix expression
- (B) Infix expression
- (C) Prefix expression
- (D) Invalid expression

44. The average depth of a binary tree is given as

- (A) $O(N)$
- (B) $O(\log N)$
- (C) $O(M \log N)$
- (D) $O(\sqrt{N})$

45. What is time complexity of fun () ?

```
int fun(int n)
{
    int count = 0;
    for (int i = n; i > 0; i /= 2)
        for (int j = 0; j < i; j++)
            count += 1;
    return count;
}
```

- (A) $O(n^2)$
- (B) $O(n \log n)$
- (C) $O(n)$
- (D) $O(n \log n \log n)$

46. The recurrence relation capturing the optimal time of the Tower of Hanoi problem with n discs is
- (A) $T(n) = 2T(n - 2) + 2$
 - (B) $T(n) = 2T(n - 1) + n$
 - (C) $T(n) = 2T\left(\frac{n}{2}\right) + 1$
 - (D) $T(n) = 2T(n - 1) + 1$
47. What is the best time complexity of bubble sort?
- (A) N^2
 - (B) $N \log N$
 - (C) N
 - (D) $N(\log N)^2$
48. How can you save memory when storing color information in Red-Black tree?
- (A) Using least significant bit of one of the pointers in the node for color information
 - (B) Using another array with colors of each node
 - (C) Storing color information in the node structure
 - (D) Using negative and positive numbering
49. Which of the following is true?
- (A) Larger the order of B-tree, less frequently the split occurs
 - (B) Larger the order of B-tree, more frequently the split occurs
 - (C) Smaller the order of B-tree, more frequently the split occurs
 - (D) Smaller the order of B-tree, less frequently the split occurs
50. The topological sorting of any DAG can be done in time.
- (A) cubic
 - (B) quadratic
 - (C) linear
 - (D) logarithmic

51. What is it called where object has its own lifecycle and child object cannot belong to another parent object?
- (A) Aggregation
 - (B) Composition
 - (C) Encapsulation
 - (D) Association
52. If a set of processes cannot be scheduled by rate monotonic scheduling algorithm, then
- (A) they can be scheduled by EDF algorithm
 - (B) they cannot be scheduled by EDF algorithm
 - (C) they cannot be scheduled by any other algorithm
 - (D) None of the above
53. A list of n string, each of length n , is sorted into lexicographic order using the merge-sort algorithm. The worst case running time of this computation is
- (A) $O(n \log n)$
 - (B) $O(n^2 \log n)$
 - (C) $O(n^2 + \log n)$
 - (D) $\theta(n^2)$
54. What is the time complexity of Floyd–Warshall algorithm to calculate all pair shortest path in a graph with n vertices?
- (A) $O(n^2 \log n)$
 - (B) $\theta(n^2 \log n)$
 - (C) $\theta(n^4)$
 - (D) $\theta(n^3)$
55. The travelling salesman problem can be solved in
- (A) polynomial time using dynamic programming algorithm
 - (B) polynomial time using branch-and-bound algorithm
 - (C) exponential time using dynamic programming algorithm or branch-and-bound algorithm
 - (D) polynomial time using backtracking algorithm

56. What does the following function do?

```
int fun(int x, int y)
{
    if (y == 0)    return 0;
    return (x + fun(x, y-1));
}
```

- (A) $x + y$
- (B) $x + x*y$
- (C) $x*y$
- (D) xy

57. Consider a sorted array of n numbers. What would be the time complexity of the best known algorithm to find a pair 'a' and 'b' such that $|a - b| = k$, k being a positive integer.

- (A) $O(n)$
- (B) $O(n \log n)$
- (C) $O(n^2)$
- (D) $O(\log n)$

58. 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?

- (A) Heap sort
- (B) Selection sort
- (C) Insertion sort
- (D) Merge sort

59. Let X be a problem that belongs to the class NP . Then which one of the following is **TRUE**?

- (A) There is no polynomial time algorithm for X
- (B) If X can be solved deterministically in polynomial time, then $P = NP$
- (C) If X is NP -hard, then it is NP -complete
- (D) X may be undecidable

60. A semaphore is a shared integer variable
- (A) that cannot drop below zero
 - (B) that cannot be more than zero
 - (C) that cannot drop below one
 - (D) that cannot be more than one
61. A relative block number is an index relative to
- (A) The beginning of the file
 - (B) The end of the file
 - (C) The last written position in file
 - (D) None of the above
62. If the offset is legal
- (A) it is used as a physical memory address itself
 - (B) it is subtracted from the segment base to produce the physical memory address
 - (C) it is added to the segment base to produce the physical memory address
 - (D) None of the above
63. 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?
- (A) 3.0 ns
 - (B) 68.0 ns
 - (C) 68.5 ns
 - (D) 78.5 ns
64. The amount of memory in a real time system is generally
- (A) less compared to PCs
 - (B) high compared to PCs
 - (C) same as in PCs
 - (D) they do not have any memory
65. The technique in which the CPU generates physical addresses directly is known as
- (A) Relocation register method
 - (B) Real addressing
 - (C) Virtual addressing
 - (D) None of the above

66. A system has 12 magnetic tape drives and 3 processes: P0, P1, and P2. Process P0 requires 10 tape drives, P1 requires 4 and P2 requires 9 tape drives.

Process

P0

P1

P2

Maximum needs (process-wise: P0 through P2 top to bottom)

10

4

9

Currently allocated (process-wise)

5

2

2

Which of the following sequence is a safe sequence?

- (A) P0, P1, P2
(B) P1, P2, P0
(C) P2, P0, P1
(D) P1, P0, P2
67. Message passing system allows processes to
- (A) communicate with one another without resorting to shared data
(B) communicate with one another by resorting to shared data
(C) share data
(D) name the recipient or sender of the message
68. In indirect communication between processes P and Q
- (A) there is another process R to handle and pass on the messages between P and Q
(B) there is another machine between the two processes to help communication
(C) there is a mailbox to help communication between P and Q
(D) None of the above
69. What is Inter process communication?
- (A) Allows processes to communicate and synchronize their actions when using the same address space
(B) Allows processes to communicate and synchronize their actions without using the same address space
(C) Allows the processes to only synchronize their actions without communication
(D) None of the above

70. Which of the following two operations are provided by the IPC facility?
- (A) Write and delete message
 - (B) Delete and receive message
 - (C) Send and delete message
 - (D) Receive and send message
71. The Banker's algorithm is than the resource allocation graph algorithm.
- (A) Less efficient
 - (B) More efficient
 - (C) Equal
 - (D) None of the above
72. Applying the LRU page replacement to the following reference string.
- 1 2 4 5 2 1 2 4**
- The main memory can accommodate 3 pages and it already has pages 1 and 2. Page 1 came in before page 2.
- How many page faults will occur?
- (A) 2
 - (B) 3
 - (C) 4
 - (D) 5
73. 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 priorities of P1 and P2 are?
- (A) Remain the same throughout
 - (B) Keep varying from time to time
 - (C) May or may not be change
 - (D) None of the above
74. Thread synchronization is required because
- (A) All threads of a process share the same address space
 - (B) All threads of a process share the same global variables
 - (C) All threads of a process can share the same files
 - (D) All of the above

75. When a page fault occurs before an executing instruction is complete if
- (A) the instruction must be restarted
 - (B) the instruction must be ignored
 - (C) the instruction must be completed ignoring the page fault
 - (D) None of the above
76. MD5 produces bits hash data.
- (A) 128
 - (B) 150
 - (C) 160
 - (D) 112
77. What is not an encryption standard?
- (A) AES
 - (B) TES
 - (C) Triple DES
 - (D) DES
78. What is cipher-block chaining?
- (A) Data is logically 'ANDed' with previous block
 - (B) Data is logically 'ORed' with previous block
 - (C) Data is logically 'XORed' with previous block
 - (D) None of the above
79. What is the role of Key Distribution Center?
- (A) It is used to distribute keys to everyone in world
 - (B) It intended to reduce the risks inherent in exchanging keys
 - (C) Both (A) and (B) above
 - (D) None of the above
80. replacement allows a process to select a replacement frame from the set of all frames, even if the frame is currently allocated to some other process.
- (A) Local
 - (B) Universal
 - (C) Global
 - (D) Public

81. Consider six memory partitions of sizes 200 KB, 400 KB, 600 KB, 500 KB, 300 KB and 250 KB, where KB refers to kilobyte. These partitions need to be allotted to four processes of sizes 357 KB, 210 KB, 468 KB and 491 KB in that order. If the best fit algorithm is used, which partitions are **NOT** allotted to any process?
- (A) 200 KB and 300 KB
 - (B) 200 KB and 250 KB
 - (C) 250 KB and 300 KB
 - (D) 300 KB and 400 KB

82. Consider the relation scheme $R = (E, F, G, H, I, J, K, L, M, N)$ and the set of functional dependencies

$\{\{E, F\} \rightarrow \{G\}, \{F\} \rightarrow \{I, J\}, \{E, H\} \rightarrow \{K, L\}, \{K\} \rightarrow \{M\}, \{L\} \rightarrow \{N\}\}$ on R .

What is the key for R ?

- (A) $\{E, F\}$
 - (B) $\{E, F, H\}$
 - (C) $\{E, F, H, K, L\}$
 - (D) $\{E\}$
83. Given the following schema.

employees (emp-id, first-name, last-name, hire-date, dept-id, salary)
departments (dept-id, dept-name, manager-id, locationid)

You want to display the last names and hire dates of all latest hires in their respective departments in the locationID 1700. You issue the following query:

```
SQL>SELECT last-name, hire-date
FROM employees
WHERE (dept-id, hire-date) IN
(SELECT dept-id, MAX(hire-date)
FROM employees JOIN departments USING(dept-id)
WHERE location-id = 1700
GROUP BY dept-id);
```

What is the outcome?

- (A) It executes but does not give the correct result
- (B) It executes and gives the correct result
- (C) It generates an error because of pair wise comparison
- (D) It generates an error because the GROUP BY clause cannot be used with table joins in a sub query

84. One of the purposes of using intermediate code in compilers is to
- (A) Make parsing and semantic analysis simpler
 - (B) Improve error recovery and error reporting
 - (C) Increase the chances of reusing the machine independent code optimizer in other compilers
 - (D) Improve the register allocation
85. In a 64-bit machine, with 2 GB RAM, and 8 KB page size, how many entries will be there in the page table if it is inverted?
- (A) 2^{18}
 - (B) 2^{20}
 - (C) 2^{33}
 - (D) 2^{51}
86. Which of the following is true for a Hash tree?
- (A) Hashing is used for sequential access
 - (B) Indexing is used for direct access
 - (C) Hash tree allows only sequential access
 - (D) Hashing is used for direct access
87. Consider the following relational schema.

```

employee (empId, empName, empDept)
customer (custId, custName, salesRepId, rating)

```

salesRepId is a foreign key referring to empId of the employee relation. Assume that each employee makes a sale to at least one customer. What does the following query return?

```

SELECT empName
FROM employee E
WHERE NOT EXISTS (SELECT custId
FROM customer C
WHERE C.salesRepId = E.empId
AND C.rating <> 'GOOD');

```

- (A) Names of all the employees with at least one of their customers having a 'GOOD' rating
- (B) Names of all the employees with at most one of their customers having a 'GOOD' rating
- (C) Names of all the employees with none of their customers having a 'GOOD' rating
- (D) Names of all the employees with all their customers having a 'GOOD' rating

88. Consider the following transaction involving two bank accounts x and y .

read(x); $x := x - 50$; write(x); read(y); $y := y + 50$; write(y)

The constraint that the sum of the accounts x and y should remain constant is that of

- (A) atomicity
 - (B) consistency
 - (C) isolation
 - (D) durability
89. A Relation R with FD set $\{A \rightarrow BC, B \rightarrow A, A \rightarrow C, A \rightarrow D, D \rightarrow A\}$.
How many candidate keys will be there in R ?
- (A) 1
 - (B) 2
 - (C) 3
 - (D) 4
90. Consider the join of a relation R with a relation S . If R has m tuples and S has n tuples, then the maximum and minimum sizes of the join respectively are
- (A) $m + n$ and 0
 - (B) mn and 0
 - (C) $m + n$ and $m - n$
 - (D) mn and $m + n$
91. In RDBMS, different classes of relations are created using technique to prevent modification anomalies.
- (A) functional dependencies
 - (B) data integrity
 - (C) referential integrity
 - (D) normal forms

92. Consider a relation $R(A, B, C, D, E, F, G, H)$, where each attribute is atomic, and following functional dependencies exist.

$CH \rightarrow G$
 $A \rightarrow BC$
 $B \rightarrow CFH$
 $E \rightarrow A$
 $F \rightarrow EG$

The relation R is

- (A) in 1NF but not in 2NF
(B) in 2NF but not in 3NF
(C) in 3NF but not in BCNF
(D) in BCNF
93. Which of the following is TRUE?
- (A) Every relation in 3NF is also in BCNF
(B) A relation R is in 3NF if every non-prime attribute of R is fully functionally dependent on every key of R
(C) Every relation in BCNF is also in 3NF
(D) No relation can be in both BCNF and 3NF
94. In RDBMS, the constraint that no key attribute (column) may be NULL is referred to as
- (A) referential integrity
(B) multi-valued dependency
(C) entity integrity
(D) functional dependency
95. Which of the following scenarios may lead to an irrecoverable error in a database system?
- (A) A transaction writes a data item after it is read by an uncommitted transaction
(B) A transaction reads a data item after it is read by an uncommitted transaction
(C) A transaction reads a data item after it is written by a committed transaction
(D) A transaction reads a data item after it is written by an uncommitted transaction
96. Which of the following is correct with respect to Two-Phase commit protocol?
- (A) Ensures serializability
(B) Prevents Deadlock
(C) Detects Deadlock
(D) Recover from Deadlock

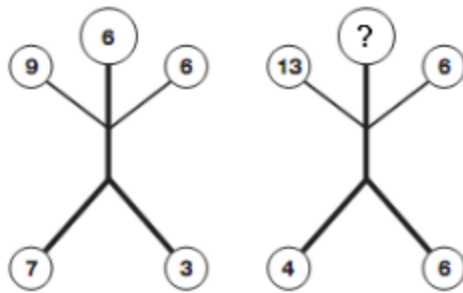
97. Let $G(x)$ be the generator polynomial used for CRC checking. What is the condition that should be satisfied by $G(x)$ to detect odd number of bits in error?
- (A) $G(x)$ contains more than two terms
 - (B) $G(x)$ does not divide $1 + x^k$, for any k not exceeding the frame length
 - (C) $1 + x$ is a factor of $G(x)$
 - (D) $G(x)$ has an odd number of terms
98. Relational database schema normalization is **NOT** for
- (A) reducing the number of joins required to satisfy a query
 - (B) eliminating uncontrolled redundancy of data stored in the database
 - (C) eliminating number of anomalies that could otherwise occur with inserts and deletes
 - (D) ensuring that functional dependencies are enforced
99. Page information in memory is also called as Page Table. The essential contents in each entry of a page table is/are
- (A) page access information
 - (B) virtual page number
 - (C) page frame number
 - (D) both virtual page number and page frame number
100. Which one of the following is **NOT** shared by the threads of the same process?
- (A) Stack
 - (B) Address Space
 - (C) File Descriptor Table
 - (D) Message Queue

101. Which letter replaces the question mark?



- (A) T
- (B) N
- (C) S
- (D) L

102. Which number replaces the question mark?



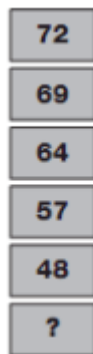
- (A) 5
- (B) 3
- (C) 1
- (D) 7

103. Which letter replaces the question mark?



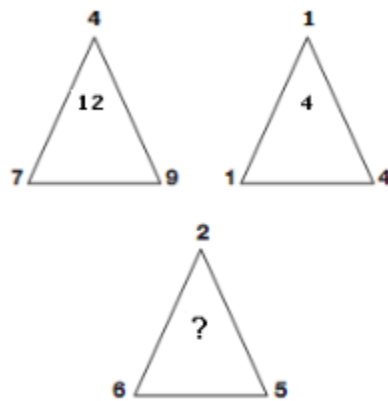
- (A) Q
- (B) A
- (C) Z
- (D) K

104. Which number replaces the question mark?



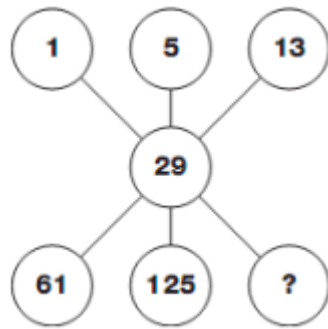
- (A) 56
- (B) 35
- (C) 33
- (D) 37

105. Which number replaces the question mark?



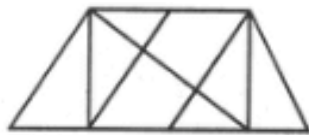
- (A) 9
- (B) 8
- (C) 4
- (D) 1

106. Which number replaces the question mark?



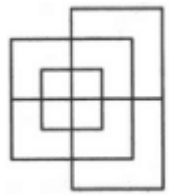
- (A) 111
- (B) 222
- (C) 253
- (D) 267

107. Find the number of triangles in the given figure.



- (A) 8
- (B) 10
- (C) 12
- (D) 14

108. Find the minimum number of straight lines required to make the given figure.



- (A) 13
- (B) 15
- (C) 17
- (D) 19

109. What is the missing number in the following sequence?

2, 12, 60, 240, 720, 1440,, 0

- (A) 2880
- (B) 1440
- (C) 720
- (D) 0

110. In a party, 60% of the invited guests are male and 40% are female. If 80% of the invited guests attended the party and if all the invited female guests attended, what would be the ratio of males to females among the attendees in the party?

- (A) 2 : 3
- (B) 1 : 1
- (C) 3 : 2
- (D) 2 : 1

111. What is the average of all multiples of 10 from 2 to 198?

- (A) 90
- (B) 100
- (C) 110
- (D) 120

112. There are 25 horses among which you need to find out the fastest 3 horses. You can conduct race among at most 5 to find out their relative speed. At no point you can find out the actual speed of the horse in a race. Find out how many races are required to get the top 3 horses.

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

113. Suppose a fair six-sided die is rolled once. If the value on the die is 1, 2, or 3, the die is rolled a second time. What is the probability that the sum total of values that turn up is at least 6?

(A) $\frac{10}{21}$

(B) $\frac{5}{12}$

(C) $\frac{2}{3}$

(D) $\frac{1}{6}$

114. If a fair coin is tossed four times. What is the probability that two heads and two tails will result?

(A) $\frac{3}{8}$

(B) $\frac{1}{2}$

(C) $\frac{5}{8}$

(D) $\frac{2}{4}$

115. What will be the next number?

3, 5, 7, 11, 13, 17,

(A) 21

(B) 19

(C) 25

(D) 20

116. Choose the missing number in the series.

9, 7, 12, 12, 15, 17, 18, 22, ?

(A) 27

(B) 21

(C) 22

(D) 24

117. Present age of Vinod and Ashok are in ratio of 3:4 respectively. After 5 years, the ratio of their ages becomes 7:9 respectively. What is Ashok's present age?
- (A) 40 years
 - (B) 28 years
 - (C) 32 years
 - (D) 36 years
118. A tourist covers half of his journey by train at 60 km/h, half of the remainder by bus at 30 km/h and the rest by cycle at 10 km/h. The average speed of the tourist in km/h during his entire journey is
- (A) 36
 - (B) 30
 - (C) 24
 - (D) 18
119. Find the next term of the given sequence.
- AD, CG, FK, JP,**
- (A) OV
 - (B) OW
 - (C) PV
 - (D) PW
120. If ROAD is written as URDG, then SWAN should be written as
- (A) VXDQ
 - (B) VZDQ
 - (C) VZDP
 - (D) UXDQ
121. A cube is built using 64 cubic blocks of side one unit. After it is built, one cubic block is removed from every corner of the cube. The resulting surface area of the body (in square units) after the removal is
- (A) 56
 - (B) 64
 - (C) 72
 - (D) 96

122. Pick the **odd one** from the following options.

- (A) CADBE
- (B) JHKIL
- (C) XVYWZ
- (D) ONPMQ

123. Find the next term of the given sequence.

QAR, RAS, SAT, TAU,

- (A) UAV
- (B) UAT
- (C) TAS
- (D) TAT

124. Excluding stoppages, the speed of a bus is 54 kmph and including stoppages, it is 45 kmph. For how many minutes does the bus stop per hour?

- (A) 9
- (B) 10
- (C) 12
- (D) 20

125. The ratio between the speeds of two trains is 7 : 8. If the second train runs 400 kms in 4 hours, then the speed of the first train is

- (A) 70 km/hr
- (B) 75 km/hr
- (C) 84 km/hr
- (D) 87.5 km/hr

126. A farmer travelled a distance of 61 km in 9 hours. He travelled partly on foot at the rate 4 km/hr and partly on bicycle at the rate 9 km/hr. The distance travelled on foot is

- (A) 14 km
- (B) 15 km
- (C) 16 km
- (D) 17 km

127. In a certain code. INSTITUTION is written as NOITUTITSNI.
How is PERFECTION written in that code?
- (A) NOICTEFREP
 - (B) NOITCEFERP
 - (C) NOITCEFRPE
 - (D) NOITCEFREP
128. In a certain code RIPPLE is written as 613382 and LIFE is written as 8192.
How is PILLER written in that code?
- (A) 318826
 - (B) 318286
 - (C) 618826
 - (D) 338816
129. Optimisation of an FSM machine can be done by
- (A) Naive-bias algorithm
 - (B) Huffman encoding scheme
 - (C) Pirate-plot algorithm
 - (D) Hopcroft minimization algorithm
130. Equivalence of automata states that
- (A) two automata accept the same set of input strings
 - (B) two automata have same set of states
 - (C) two automata does not contain initial input symbols
 - (D) two automata share equal transition function
131. A programmer has a 95% chance of finding a bug every time she compiles his code, and it takes her three hours to rewrite the code every time she discovers a bug. Find the probability that she will finish her program by the end of her workday. (Assume that a workday is 9 hours).
- (A) 76%
 - (B) 44%
 - (C) 37%
 - (D) 28%

132. If G is a simple graph with n -vertices and $n \geq 3$, the condition for G has a Hamiltonian circuit is
- (A) the degree of each vertex is at most $\frac{n}{2}$
 - (B) the degree of each vertex is equal to n
 - (C) the degree of every vertex is at least $\frac{n+1}{2}$
 - (D) the degree of every vertex in G is at least $\frac{n}{2}$
133. For an n -vertex undirected graph, the time required to find a cycle is
- (A) $O(n)$
 - (B) $O(n^2)$
 - (C) $O(n + 1)$
 - (D) $O(\log n)$
134. Given the factorization of a number n , then the sum of divisors can be computed in
- (A) linear time
 - (B) polyomial time
 - (C) $O(\log n)$
 - (D) $O(n + 1)$
135. In the principle of mathematical induction, which of the following steps is mandatory?
- (A) Induction hypothesis
 - (B) Inductive reference
 - (C) Induction set assumption
 - (D) Minimal set representation
136. If a, b are two distinct prime number than highest common factor of a, b is
- (A) 2
 - (B) 0
 - (C) 1
 - (D) ab
137. If a, b, c, d are distinct prime numbers with a as smallest prime then $a * b * c * d$ is

- (A) odd number
- (B) even number
- (C) prime number
- (D) Either prime number or even number

138. Sum of two different prime numbers is a

- (A) prime number
- (B) composite number
- (C) either prime or composite
- (D) even number

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139. How many prime numbers are there between 1 to 20?
- (A) 5
 - (B) 6
 - (C) 7
 - (D) 8
140. If minimum cost edge of a graph is unique, then that edge will be added to any MST. Choose the correct option.
- (A) false
 - (B) maximum cost edge is added
 - (C) true
 - (D) minimum cost edge need not be unique
141. An immediate application of minimum spanning tree
- (A) gesture analysis
 - (B) handwriting recognition
 - (C) fingerprint detection
 - (D) soft computing
142. In a maximum spanning tree the weighted graph is of
- (A) maximum number of edges
 - (B) maximum number of cyclic trees
 - (C) minimum number of vertices
 - (D) maximum weight
143. The spanning tree will be maximally acyclic if
- (A) one additional edge makes a cycle in the tree
 - (B) two additional edges makes a cycle in the tree
 - (C) removing one edge makes the tree cycle free
 - (D) removing two edges make the tree cycle free
144. In a get-together party, every person present shakes the hand of every other person. If there were 91 handshakes in all, how many persons were present at the party?
- (A) 15
 - (B) 14
 - (C) 16
 - (D) 17

145. A bag contains 25 balls such as 10 balls are red, 7 are white and 8 are blue. What is the minimum number of balls that must be picked up from the bag blindfolded (without replacing any of it) to be assured of picking at least one ball of each colour?
- (A) 10
 - (B) 18
 - (C) 63
 - (D) 35
146. If the weight of an edge e of cycle C in a graph is larger than the individual weights of all other edges of C , then that edge
- (A) belongs to an minimum spanning tree
 - (B) cannot belong to an minimum spanning tree
 - (C) belongs to all MSTs of the graph
 - (D) can not belong to the graph
147. Which of these is the easiest way of communication?
- (A) E-mail
 - (B) Telephone
 - (C) Fax
 - (D) Letter
148. A cyclic group is always
- (A) abelian group
 - (B) monoid
 - (C) semigroup
 - (D) subgroup
149. A group $(M, *)$ is said to be Abelian for any two $x, y \in M$, if
- (A) $(x+y)=(y+x)$
 - (B) $(x*y)=(y*x)$
 - (C) $(x+y)=x$
 - (D) $(y*x)=(x+y)$
150. Which of these do not deal with precise information?
- (A) Engineer
 - (B) Scientist
 - (C) Technician
 - (D) Fiction writer

FINAL ANSWER KEY

Subject Name: 502 MSC COMPUTER SCIENCE

SI No.	Key	SI No.	Key	SI No.	Key	SI No.	Key	SI No.	Key
1	A	31	C	61	A	91	D	121	D
2	C	32	B	62	A	92	A	122	D
3	B	33	C	63	C	93	C	123	A
4	B	34	D	64	A	94	C	124	B
5	C	35	B	65	B	95	D	125	D
6	B	36	A	66	D	96	A	126	C
7	B	37	B	67	A	97	C	127	D
8	B	38	C	68	C	98	A	128	A
9	C	39	C	69	B	99	C	129	B
10	A	40	D	70	D	100	A	130	A
11	D	41	A	71	A	101	C	131	D
12	B	42	B	72	C	102	A	132	D
13	D	43	D	73	B	103	D	133	A
14	A	44	D	74	D	104	D	134	B
15	A	45	C	75	A	105	A	135	A
16	A	46	D	76	A	106	C	136	C
17	C	47	C	77	B	107	D	137	B
18	A	48	A	78	C	108	A	138	C
19	C	49	A	79	B	109	B	139	D
20	C	50	C	80	C	110	B	140	C
21	D	51	A	81	A	111	B	141	B
22	D	52	C	82	B	112	C	142	D
23	B	53	B	83	B	113	B	143	A
24	C	54	D	84	C	114	A	144	B
25	A	55	C	85	A	115	B	145	B
26	C	56	C	86	D	116	B	146	B
27	C	57	A	87	D	117	A	147	A
28	D	58	B	88	B	118	C	148	A
29	C	59	C	89	C	119	A	149	B
30	A	60	A	90	B	120	B	150	D