



Duration: 2 Hours

No. of MCQ : 100

Full Marks: 120

**INSTRUCTIONS**

1. All questions are of objective type having four answer options for each.
2. Category-1 : Carries 1 mark each and only one option is correct. In case of incorrect answer or any combination of more than one answer,  $\frac{1}{4}$  mark will be deducted.
3. Category-2 : Carries 2 marks each and one or more option(s) is/are correct. If all correct answers are not marked and no incorrect answer is marked, then score =  $2 \times$  number of correct answers marked  $\div$  actual number of correct answers. If any wrong option is marked or if any combination including a wrong option is marked, the answer will be considered wrong, but there is **no negative marking** for the same and zero mark will be awarded.
4. Questions must be answered on OMR sheet by darkening the appropriate bubble marked A, B, C, or D.
5. Use only **Black/Blue ink ball point pen** to mark the answer by filling up of the respective bubbles completely.
6. Write question booklet number and your roll number carefully in the specified locations of the OMR Sheet. Also fill appropriate bubbles.
7. Write your name (in block letters), name of the examination center and put your signature (as is appeared in Admit Card) in appropriate boxes in the **OMR Sheet**.
8. The OMR sheet is liable to become invalid if there is any mistake in filling the correct bubbles for question booklet number/roll number or if there is any discrepancy in the name/signature of the candidate, name of the examination center. The OMR Sheet may also become invalid due to folding or putting stray marks on it or any damage to it. The consequence of such invalidation due to incorrect marking or careless handling by the candidate will be the sole responsibility of candidate.
9. Candidates are not allowed to carry any written or printed material, calculator, pen, log-table, wristwatch, any communication device like mobile phones, bluetooth device etc. inside the examination hall. Any candidate found with such prohibited items will be **reported against** and his/her candidature will be summarily cancelled.
10. Rough work must be done on the question booklet itself. Additional blank pages are given in the question booklet for rough work.
11. Hand over the OMR Sheet to the invigilator before leaving the Examination Hall.

Signature of the Candidate : \_\_\_\_\_  
(as in Admit Card)

Signature of the Invigilator : \_\_\_\_\_



Category-1 (Q. 1 to 80)

(Carry 1 mark each. Only one option is correct. Negative marks : - ¼)

1. What is the output of the following program ?

```
#include <stdio.h>
void main ()
{
    int a = 40;
    float b;
    b = ++a;
    printf(“%d, %f”, a, ++b);
}
```

- (A) 41, 42.000000 (B) 41, 42  
(C) 41, 41.000000 (D) 41, 41

2. What is the output of the following program ?

```
#include <stdio.h>
void main ()
{
    int a = -7;
    float b;
    b = a++;
    printf(“%d, %f”, a, ++b);
}
```

- (A) -6, -7.000000 (B) -5, -6  
(C) -6, -6.000000 (D) -6, -6

3. What is the output of the following program ?

```
#include <stdio.h>
void main ()
{
    int i = -1;
    printf(“sizeof(i) = %d”, sizeof(i));
}
```

- (A) Compiler Error (B) sizeof(i) = -1  
(C) sizeof(i) = 1 (D) sizeof(i) = 4

4. What is the output of the following program ?

```
#include <stdio.h>
void main()
{
    int x = -1, y = 1, z = 0;
    if(x && y++ && z)
        ++x, y++, --z;
    printf(“%d, %d, %d”, x++, y++, z++);
}
```

- (A) 0, 3, 0 (B) Compiler Error  
(C) -1, 2, 0 (D) 1..0



## JECA-2023

5. What is the output of the following program ?

```
#include <stdio.h>
enum colors{RED, BROWN, ORANGE};
void main( )
{
    printf (“%ld..%f..%d”, RED, BROWN, ORANGE);
}
```

- (A) Compiler Error (B) 0..0.000000..1  
(C) 0..1.000000..2 (D) Runtime Error

6. What is the output of the following program ?

```
#include <stdio.h>
void main ( )
{
    char M = ‘M’;
    printf(“%d, %c”, M, M);
}
```

- (A) Runtime Error (B) Compiler error  
(C) 76, M (D) 77, M

7. What is the output of the following program ?

```
#include <stdio.h>
void main( )
{
    int i = -9;
    printf(“%d %d %d”, i++, ++i, ++i);
}
```

- (A) Compiler error (B) -6 -7 -8  
(C) -7 -7 -8 (D) -7 -6 -6

8. What is the output of the following program ?

```
#include<stdio.h>
void main( )
{
    int **ptr;
    int temp = 65;
    ptr[0] = &temp;
    printf(“%d”, ptr[0][0]);
}
```

- (A) Compiler error (B) 65  
(C) Segmentation Fault (D) Runtime Error



9. What is the output of the following program ?
- ```
#include <stdio.h>
#include <stdlib.h>
void main( )
{
    int *ptr;
    ptr = (int*) calloc(3, sizeof(int));
    ptr[2] = 30;
    printf(“%d”, *ptr);
    free(ptr);
}
```
- (A) 30 (B) 0  
(C) calloc (D) Error
10. \_\_\_\_\_ interrupt may happen due to power failure.  
(A) I/O (B) Timer  
(C) Hardware (D) Program
11. Address of the next instruction to be executed is specified by \_\_\_\_\_.  
(A) MBR (B) MAR  
(C) PSW (D) PC
12. Auxiliary memory is also known as \_\_\_\_\_ memory.  
(A) Primary (B) Secondary  
(C) Binary (D) Quad
13. BIOS means \_\_\_\_\_.  
(A) basic input/output system (B) best input/output system  
(C) basic input system (D) basic output system
14. \_\_\_\_\_ is the most appropriate scheduling in case of a time-shared operating system.  
(A) FCFS (B) RR  
(C) SJF (D) SRTF
15. If only one process can be able to access a particular resource at a time, then it is known as \_\_\_\_\_.  
(A) Mutual execution (B) Mutual exclusion  
(C) Multiple execution (D) Multiple exclusion
16. Resource allocation graph is used to represent \_\_\_\_\_.  
(A) deadlock (B) virtual memory  
(C) main memory (D) scheduling
17. Banker’s algorithm for resource allocation deals with \_\_\_\_\_.  
(A) mutual exclusion (B) mutual inclusion  
(C) deadlock recovery (D) deadlock avoidance



18. Page fault means \_\_\_\_\_.
- (A) required page is available in main memory  
 (B) required page is not available in main memory  
 (C) segment number  
 (D) reduce page I/O
19. \_\_\_\_\_ is a technique to move a process from main memory to secondary memory.
- (A) Deadlock (B) Synchronization  
 (C) Caching (D) Swapping
20. Demand paging is considered as \_\_\_\_\_.
- (A) fetching a page when not needed (B) switching between two processes  
 (C) fetching a page only when needed (D) switching between two threads
21. Thrashing means a condition having \_\_\_\_\_.
- (A) minimum paging (B) optimized paging  
 (C) synchronized paging (D) excessive paging
22. A counting semaphore is initialized to 15. Then, 4 wait operations and 2 signal operations are completed on this semaphore. The resulting value of the semaphore is \_\_\_\_\_.
- (A) 11 (B) 13  
 (C) 17 (D) 19
23. What do you mean by fork() ? Choose the correct option.
- (A) Starvation (B) Creation of new task  
 (C) Demand paging (D) Semaphore
24. In file management, FAT means \_\_\_\_\_.
- (A) Feature Access Table (B) File Access Table  
 (C) Fault Allocation Table (D) File Allocation Table
25. What is the output of the following program ?
- ```
#include <iostream>
using namespace std;
int addition (int a, int b)
{
    return a+b;
}
double addition (double a, double b)
{
    return a+b;
}
int main ()
{
    cout<< addition (35,20) << “,”;
    cout<< addition (34.1,12.7);
    return 0;
}
```
- (A) 55;46.8 (B) Compile Error  
 (C) Runtime Error (D) Segmentation Fault



26. What is the output of the following program ?

```
#include <iostream>
using namespace std;
template <class C1, class C2>
bool is_equal (C1 var1, C2 var2)
{
    return (var1 == var2);
}
int main ()
{
    if (is_equal(10,10.0))
        cout<< "Equal";
    else
        cout<< "Not equal";
    return 0;
}
```

- (A) Equal (B) Not equal  
(C) Compile Error (D) Runtime Error

27. What is the output of the following program ?

```
#include <iostream>
using namespace std;
int main()
{
    int var = 0;

    while ( var< 10 )
    {
        cout<< var << " ";
        var++;
    }
    cout<< var;
    return 0;
}
```

- (A) 0 1 2 3 4 5 6 7 8 9 10 (B) 0 1 2 3 4 5 6 7 8 9  
(C) 1 2 3 4 5 6 7 8 9 10 (D) 1 2 3 4 5 6 7 8 9



28. What is the output of the following program ?

```
#include <iostream>
using namespace std;
struct demo
{
    int var;
};
int main()
{
    demo str;
    demo *ptr;

    str.var = 100;
    ptr = &str;
    cout<<ptr -> var;
    return 0;
}
```

- (A) 100
- (B) Memory address of var
- (C) Compile Error
- (D) L-value Error

29. What is the output of the following program ?

```
#include <iostream>
using namespace std;
int main ()
{
    int c1 = 10;
    int c2 = 20;
    {
        int c1;
        c1 = 50;
        c2 = 50;
        cout<< "c1= " << c1 << ", c2= " << c2;
    }
    cout<< "; c1= " << c1 << ", c2= " << c2;
    return 0;
}
```

- (A) c1= 50, c2= 50; c1= 10, c2= 50
- (B) c1= 10, c2= 20; c1= 10, c2= 20
- (C) c1= 50, c2= 50; c1= 10, c2= 20
- (D) c1= 10, c2= 20; c1= 10, c2= 50



30. What is the output of the following program ?

```
#include <iostream>
using namespace std;

class Demo {
public:
static int count;
Demo () { count++; }
};

int Demo::count = 0;

int main ()
{
    Demo var1;
    Demo var2[5];
    cout<< var1.count;
    return 0;
}
```

- (A) 6
- (B) 1
- (C) 2
- (D) 5

31. What is the output of the following program ?

```
#include<iostream>
using namespace std;

void print();
int main()
{
    int var = 0;
    var = print();
    cout<< var;
    return 0;
}

void print()
{
    cout<< "Hi";
}
```

- (A) Compile Error
- (B) Hi
- (C) 0
- (D) Hi0



32. What is the output of the following program ?

```
#include <iostream>
using namespace std;

int main()
{
    int var = 2;
    do
    {
        cout<<var;
    }while(var--);
    return 0;
}
```

- (A) 210 (B) 21  
 (C) 2 (D) 1
33. In shell script, which command is used to create a new directory ?  
 (A) vi (B) touch  
 (C) cd (D) mkdir
34. In shell script, which command is used to copy a file ?  
 (A) copy (B) cpy  
 (C) cp (D) cy
35. In shell script, which command is used to delete a file ?  
 (A) delete (B) del  
 (C) remove (D) rm
36. In Unix/Linux platform, which command is used to find out the difference between two files ?  
 (A) diff (B) comm  
 (C) du (D) whereis
37. In Unix/Linux platform, which command is used to create a symbolic link ?  
 (A) ls -s (B) ls -i  
 (C) ln -sym (D) ln -s
38. In Unix/Linux platform, which command is used to view the inode number of a file ?  
 (A) ls -i (B) ls -a  
 (C) ls -l (D) ls -r
39. In Unix/Linux platform, which command is used to specify the access mode for files ?  
 (A) chmod (B) cm  
 (C) am (D) chacc
40. In Unix/Linux platform, \_\_\_\_\_ command is used to show current running processes.  
 (A) ps (B) ls  
 (C) sh (D) du
41. In singly linked list, the time complexity for insertion at a particular node is \_\_\_\_\_.  
 (A) O(1) (B) O(n<sup>2</sup>)  
 (C) O(n) (D) O(n logn)
42. In stack data structure, \_\_\_\_\_ operation is not permitted.  
 (A) Push (B) Pop  
 (C) Empty\_Check (D) Enqueue



43. In tree data structure, the in-degree of root node is always \_\_\_\_\_.
- (A) 0 (B) 1  
(C) 2 (D) 3
44. In binary tree data structure, using depth-first approach, preorder traversal means \_\_\_\_\_.
- (A) Root → Left-Subtree → Right-Subtree  
(B) Left-Subtree → Root → Right-Subtree  
(C) Left-Subtree → Right-Subtree → Root  
(D) Left-Subtree → Right-Subtree
45. Find out the wrong statement based on the characteristics of AVL tree data structure.
- (A) AVL tree is a binary search tree in nature.  
(B) AVL tree is known as height-balanced tree.  
(C) AVL tree has  $O(\log_2 n)$  search time complexity considering 'n' as number of nodes.  
(D) AVL tree has  $O(n)$  search time complexity considering 'n' as number of nodes.
46. Example of non-linear data structure is \_\_\_\_\_.
- (A) Linked-list (B) Graph  
(C) Queue (D) Stack
47. Bubble sort algorithm has a worst-case time complexity of \_\_\_\_\_.
- (A)  $O(n)$  (B)  $O(n^2)$   
(C)  $O(n^3)$  (D)  $O(n^4)$
48. Insertion sort algorithm has a best-case time complexity of \_\_\_\_\_.
- (A)  $O(n)$  (B)  $O(n^2)$   
(C)  $O(n^3)$  (D)  $O(n^4)$
49. In machine learning, VC dimension is used to measure the capacity of a set of functions. VC means \_\_\_\_\_.
- (A) Vapnik–Chervonenkis (B) Vipnak–Charvonenkis  
(C) Virtual Connectivity (D) Variable Connectivity
50. Artificial Neural networks are \_\_\_\_\_ algorithms.
- (A) computational (B) non-computational  
(C) fictional (D) ready-made
51. One-class SVM is \_\_\_\_\_ algorithm.
- (A) unsupervised (B) supervised  
(C) wrapper (D) filter
52. Time complexity of K-Means clustering is \_\_\_\_\_.
- (A)  $O(kN)$  (B)  $O(kN^2)$   
(C)  $O(k+N)$  (D)  $O(k+N^2)$
53. \_\_\_\_\_ algorithm is used to find out the shortest path between two points in a connected weighted graph.
- (A) Kruskal (B) K-Means  
(C) BIRCH (D) Ward
54. Forward–backward algorithm is used in case of HMM to compute \_\_\_\_\_ of all hidden state variables.
- (A) posterior marginal (B) posterior vacuum  
(C) prior marginal (D) prior vacuum



## JECA-2023

55. HMM is a specific instance of CRF which is known as \_\_\_\_\_.
- (A) conditional random fields (B) characterised routine fields  
(C) characterised random fields (D) conditional routine fields
56. In FP-Growth Algorithm, FP means \_\_\_\_\_.
- (A) frequent pattern (B) first pattern  
(C) favourite pattern (D) find pattern
57. In software engineering, what is the full form for PERT chart ?
- (A) Project Evaluation and Review Technique  
(B) Performance Evaluation and Review Technique  
(C) Program Evaluation and Review Technique  
(D) Part Evaluation and Review Technique
58. In software engineering, the testing performed by development team is known as \_\_\_\_\_.
- (A) Acceptance testing (B)  $\alpha$  testing  
(C)  $\beta$  testing (D) validation testing
59. In software engineering, a prototyping model can be used when \_\_\_\_\_.
- (A) Technical solutions are unclear to the development team  
(B) Technical solutions are clear to the development team  
(C) Models are unclear to the development team  
(D) Feasibility solutions are unclear to the development team
60. In classical waterfall model, which phase comes before the design phase ?
- (A) Maintenance  
(B) Coding and unit testing  
(C) Integration and system testing  
(D) Requirements analysis and specification
61. In software engineering, which of the following is not a type of cohesion ?
- (A) Projection (B) Procedural  
(C) Logical (D) Temporal
62. In software engineering, which of the following is not a type of coupling ?
- (A) Data (B) Connection  
(C) Control (D) Stamp
63. Choose the correct option as the activities of the first quadrant of Spiral model.
- (A) Determine objectives, alternatives and constraints  
(B) Evaluate alternatives  
(C) A detailed analysis of each project task  
(D) Develop and validate next level of the product
64. Choose the appropriate black-box testing technique in software engineering.
- (A) Boundary value analysis (B) Verification testing  
(C) Validation testing (D) Acceptance testing
65. In User Datagram packet format, the size of the header is \_\_\_\_\_.
- (A) 8 bytes (B) 8 bits  
(C) 4 bytes (D) 4 bits
66. Transmission Control Protocol (TCP) offers \_\_\_\_\_ service in which data can flow in both directions at the same time.
- (A) full-duplex (B) half-duplex  
(C) bit-duplex (D) byte-duplex



67. Example of a two-layer switch is \_\_\_\_\_.
- (A) bridge (B) router  
(C) LAN (D) WAN
68. A \_\_\_\_\_ routing table contains information entered manually.
- (A) static (B) dynamic  
(C) RIP (D) OSPF
69. BOOTP is \_\_\_\_\_ layer protocol.
- (A) application (B) physical  
(C) network (D) datalink
70. ICMP always reports error messages to the original \_\_\_\_\_.
- (A) source (B) destination  
(C) router (D) bridge
71. The \_\_\_\_\_ program uses ICMP messages and TTL field in IP packet to find route.
- (A) traceroute (B) ftp  
(C) trace (D) tftp
72. SNMP is \_\_\_\_\_ level protocol.
- (A) application (B) physical  
(C) network (D) datalink
73. Which key can be derived directly from a Super Key ?
- (A) Primary key (B) Foreign key  
(C) Candidate key (D) Database key
74. Relational Algebra is \_\_\_\_\_ query language.
- (A) Non-procedural (B) Schema  
(C) Singleton (D) Procedural
75. In case of union compatibility, \_\_\_\_\_
- (A) two relations must have same set of attributes.  
(B) relations can have any set of attributes.  
(C) two relations must have different set of attributes.  
(D) no relations are union compatible.
76. Which option cannot be used with “ALTER table” command in SQL ?
- (A) Modify (B) Drop  
(C) Add (D) Delete
77. Third normal form (3NF) removes \_\_\_\_\_ from a relation.
- (A) MVD (B) Determinants  
(C) Transitive dependency (D) Schemas
78. Which option is not a step for query processing ?
- (A) Scanning, parsing and semantic analysis (B) Query optimization  
(C) Query code generator (D) Meta data organizer
79. Which of the following option is not a transaction state ?
- (A) Active (B) Partially committed  
(C) Terminated (D) Updated
80. Which of the following option does not have any partial functional dependencies ?
- (A) BCNF (B) 4NF  
(C) 3NF (D) 2NF



Category-2 (Q. 81 to 100)

(Carry 2 marks each. One or more options are correct. No negative marks)

81. In C programming, which file operations are valid ?  
(A) fopen (B) fclose  
(C) fprintf (D) fscanf
82. Specify the functions mentioned in “string.h” header file.  
(A) strcat (B) strcmp  
(C) strlen (D) strcpy
83. Basic elements of a computer mean \_\_\_\_\_.  
(A) Central Processing Unit (B) Centered Processing Unit  
(C) Main Memory (D) Daemon Process
84. Select the correct I/O communication techniques from the following options.  
(A) Direct Memory Access (B) Virtual Drum Access  
(C) Programmed I/O (D) Interrupt Driven I/O
85. Select the correct buffering types in I/O management.  
(A) Single buffering (B) Multiple buffering  
(C) Double buffering (D) Circular buffering
86. Select the correct disk scheduling algorithms.  
(A) FCFS (B) SSTF  
(C) SCAN (D) C-SCAN
87. Choose the correct options from the following statements.  
(A) while loop is known as entry-controlled loop.  
(B) do-while loop is known as entry-controlled loop.  
(C) while loop is known as exit-controlled loop.  
(D) do-while loop is known as exit-controlled loop.
88. Choose the correct bitwise operators from the options.  
(A) != (B) %  
(C) & (D) |
89. Select the correct UNIX wildcard characters from the options.  
(A) \* (B) ?  
(C) [ ] (D) { }
90. In shell script, what is the command to show the list of files ?  
(A) ls (B) ls -l  
(C) ps (D) pwd



**JECA-2023**

- 91.** Select the correct Linked list types from the options.  
(A) Linear linked list (B) Circular linked list  
(C) Doubly linked list (D) Char linked list
- 92.** Select the correct Linked list operations from the options.  
(A) Insertion of a node (B) Deletion of a node  
(C) Search a node (D) Re-shaping a node
- 93.** In machine learning, there are various types of learning. Choose the correct options based on learning types.  
(A) Supervised (B) Unsupervised  
(C) Reinforcement (D) HMM
- 94.** Apriori algorithm was proposed by \_\_\_\_\_ and \_\_\_\_\_ in 1994.  
(A) Agrawal (B) Srikant  
(C) Ramesh (D) Roy
- 95.** In software engineering, choose the correct activities undertaken during maintenance in SDLC.  
(A) Corrective maintenance (B) Perfective maintenance  
(C) Non-adaptive maintenance (D) Error ratio maintenance
- 96.** Select the appropriate properties of a good Software Requirement Specification (SRS).  
(A) Correctness (B) Completeness  
(C) Consistency (D) Risk
- 97.** User Datagram Protocol (UDP) is \_\_\_\_\_ transport protocol.  
(A) reliable (B) unreliable  
(C) connectionless (D) connection-oriented
- 98.** Congestion in a network occurs because \_\_\_\_\_ and \_\_\_\_\_ have queues (buffers) to hold the packets before and after processing.  
(A) routers (B) switches  
(C) source (D) destination
- 99.** Select correct options as the levels of Data Abstraction in architecture for Database system.  
(A) View level (B) Logical level  
(C) Schema level (D) Structured level
- 100.** Select correct options as the examples of multi-valued attributes.  
(A) Address (B) Email ID  
(C) PAN card number (D) Roll number



**JECA-2023**

**SPACE FOR ROUGH WORK**

