JECA-2024

(Booklet Number)

4060005381

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, ¼ 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 × number of correct answers marked ÷ 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 : _____

SPACE FOR ROUGH WORK

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 code snippet ?

```
#include<stdio.h>
main( ){
int x = 65, *p = &x;
void *q=p;
char *r=q;
printf("%c",*r);
}
```

(A) A
(B) Z
(C) 65
(D) None of the above

2. ROM is a
(A) Combinational Circuit
(B) Static Circuit
(C) Sequential Circuit
(D) Magnetic Circuit

3. A computer with a 32 bit wide data bus uses 4 k × 8 static RAM memory chips. The smallest memory this computer is
(A) 8 kb
(B) 16 kb
(C) 24 kb
(D) 32 kb

4. Each stage in pipelining should be completed within _____ cycle(s).
(A) 1
(B) 2
(C) 3
(D) 4

5. Relational calculus is a
(A) Procedural language
(B) Non-procedural language
(C) Data definition language
(D) High-level language

6. How many parameters does a default constructor require ?

(A) 1 (B) 2

(C) 0 (D) 3

7. An artificially intelligent car decreases its speed based on its distance from the car in front of it. Which method is used ?

(A) Naive – Bayes (B) Decision Tree

(C) Linear Regression (D) Logistic Regression

8. The keyword friend does not appear in

(A) the class allowing access to another class.

(B) the class desiring access to another class.

(C) the private section of a class.

(D) the public section of a class.

9. What is the maximum number of level-2 DFD possible if the number of processes in level-1 DFD is n ?

(A) $\frac{n}{2}$ (B) 2

(C) n^2 (D) n

10. The small extremely fast RAM's are termed as _____.

(A) Heaps (B) Accumulators

(C) Stacks (D) Cache

11. K-means clustering method is an example of which type of clustering method?

(A) Hierarchical (B) Random

(C) Density based (D) Partitioning

12. The store and forward mechanism is used in

(A) packet switching. (B) message switching.

(C) circuit switching. (D) data gram switching.

13. What is the output of the following C-program ?

```
#include<stdio.h>
int main( )
{   const int a=10;
    printf("%d", ++a);
    return 0;
}
```

(A) 11 (B) 10

(C) Compilation Error (D) 0

14. How can you display a list of all files including the hidden files ?

(A) find all (B) find –a

(C) ls –a (D) All of these

15. Which C keyword is used to extend the visibility of variables ?

(A) extend (B) extends

(C) extern (D) auto

16. Which of the following should not have transitive dependency ?

(A) First normal form (B) Second normal form

(C) Third normal form (D) Fourth normal form

17. Regression is a type of :

(A) Supervised learning (B) Unsupervised learning

(C) Reinforcement learning (D) None of the above

18. What is the output of the following C-program ?

```
#include<stdio.h>
#define CUBE(x) (x*x*x)
int main( )
{
    int a, b=3;
    a = CUBE(b++);
    printf("%d, %d\n", a, b);
    return 0;
}
```

(A) 9, 4
(B) 27, 4
(C) 27, 6
(D) Error

19. The _____ is an asymmetric key cryptographic algorithm.

(A) RSA
(B) Huffman code
(C) Mono-alphabetic substitution
(D) Steganography

20. What is the purpose of the confusion matrix in machine learning ?

(A) To visualize the distribution of the data in a dataset
(B) To compare the performance of different models
(C) To evaluate the performance of a classification model
(D) To evaluate the performance of a regression model

21. In DMA transfers, the required signals and addresses are given by the _____.

(A) Processor
(B) Device drivers
(C) DMA controllers
(D) The program itself

22. What is the output of following C code ?

```
int main( )
{
    int x = 2, y = 1;
    x * = x + y;
    printf("%d", x);
}
```

(A) Compilation error
(B) Varies on Complier
(C) 5
(D) 6

23. Which among the following can't be used for polymorphism ?

(A) Static member functions
(B) Member functions overloading
(C) Predefined operator overloading
(D) Constructor overloading

24. If there are 32 segments each of size 1K bytes, then the logical address should have

(A) 12 bits
(B) 13 bits
(C) 14 bits
(D) 15 bits

25. In software engineering the tester does not know the internal designs of the software application in case of _____ testing.

(A) White Box
(B) Black Box
(C) Beta
(D) Acceptance

26. What is the output of the following code snippet ?

```
#include <stdio.h>
    int main( )
    {
        int x;
        x = 5 > 8 ? 10 : 1 !=2 < 5 ? 20 : 30;
        printf("%d",x);
        return 0;
    }
```

(A) 5 (B) 10
(C) 20 (D) 30

27. _____ is a measure of the degree of interdependence between modules.

(A) Cohesion (B) Coupling
(C) None of the above mentioned (D) Both (A) and (B)

28. The permission -rwx r--r-- represented in octal expression will be

(A) 777 (B) 744
(C) 666 (D) 711

29. What will be the output of the C code ?

```
#include <stdio.h>
int main( )
{ int a=1;
if(a--)
printf("True");
if(a++)
print("False");
}
```

(A) True (B) False
(C) True False (D) No output

30. Which command changes a file's group owner ?

(A) cgrp (B) group

(C) change (D) chgrp

31. Which of the following is an example of a classification problem ?

(A) Predicting the price of a house based on its features

(B) Predicting the weight of a person based on their height

(C) Predicting whether a customer will churn or not

(D) Predicting the age of a person based on their income

32. What is the output of the C-program ?

```
#include<stdio.h>
    int main( )
        {
            int i=0;
            int x=i++;
            y=++i;
            printf("%d %d", x, y);
        }
```

(A) 0, 2 (B) 1, 2

(C) 1, 1 (D) compile error

33. What is the difference between supervised and unsupervised learning ?

(A) Supervised learning requires labelled data while unsupervised learning does not.

(B) Unsupervised learning requires labelled data while supervised learning does not.

(C) Supervised learning does not require data while unsupervised learning does.

(D) There is no difference between supervised and unsupervised learning.

34. Which of the following feature is shown by function overriding ?

(A) Abstraction
(B) Polymorphism
(C) Encapsulation
(D) Inheritance

35. If a file has read and write permission for the owner, then the octal representation of the permissions will be :

(A) 7
(B) 5
(C) 6
(D) 3

36. In an ER diagram, an entity set is represented by a

(A) Rectangle
(B) Ellipse
(C) Diamond box
(D) Circle

37. What is the output of the C-program ?

```
#include<stdio.h>
    int main( )
        {
            int i=0;
            while (i=0)
            printf("\n True");
            printf("\n False");
        }
```

(A) True (infinite time)
(B) Compiler dependent
(C) False
(D) True (1 time)

38. Identify the incorrect constructor type :

(A) Friend Constructor
(B) Copy Constructor
(C) Default Constructor
(D) Parameterized Constructor

39. _____ specification is also known as the SRS document.

(A) White-box
(B) Grey-box
(C) Black-box
(D) None of the above mentioned

40. What is the output of the following code snippet ?

```
main( ) {
    int i, k = 5;
        if(i = k) {
            printf ("YES\n");
        }
            else {
                printf("NO\n");
            }
        }
```

(A) 5
(B) YES
(C) NO
(D) Will give error

41. Which of the following(s) is/are not shared by threads ?

(A) Stack
(B) Program counter
(C) Both program counter and stack
(D) None

42. Given an unsorted array. The array has this property that every element in the array is at most k distance from its position in a sorted array where k is a positive integer smaller than the size of an array. Which sorting algorithm can be easily modified for sorting this array and what is the obtainable time complexity ?

(A) Insertion Sort with time complexity O(kn)

(B) Heap Sort with time complexity O(n log k)

(C) Quick Sort with time complexity O(k log k)

(D) Merge Sort with time complexity O(k log k)

43. Which one of the following is a synchronization tool ?

(A) Thread

(B) Pipe

(C) Semaphore

(D) Socket

44. When a process is in a "Blocked" state waiting for some I/O service. When the service is completed, it goes to the _____.

(A) Terminated state

(B) Suspended state

(C) Running state

(D) Ready state

45. A process is thrashing if _____.

(A) it spends more time in execution, rather than paging

(B) it spends more time in paging, rather than in execution

(C) it has no memory allocated to it

(D) it indefinitely waits for a resource

46. _____ is not among the eight principles followed by the Software Code of Ethics and Professional Practice.

(A) PRODUCT

(B) ENVIRONMENT

(C) PUBLIC

(D) PROFESSION

47. Making class members inaccessible to nonmember functions is an example of :

(A) polymorphism
(B) data hiding
(C) redundancy
(D) recursion

48. In a relational database, what does the term "ACID" stand for ?

(A) Atomicity, Consistency, Integrity, Durability
(B) Association, Constraint, Index, Database
(C) Authorization, Compatibility, Isolation, Dependency
(D) Aggregate, Collection, Inheritance, Design

49. Which of the given statement is the correct recurrence for the worst case of Binary Search ?

(A) $T(n) = 2T(n/2) + O(1)$ & $T(1) = O(1) = T(0)$.
(B) $T(n) = T(n - 1) + O(1)$ & $T(1) = O(1) = T(0)$.
(C) $T(n) = T(n/2) + O(1)$ & $T(1) = T(0) = O(1)$.
(D) $T(n) = T(n - 2) + O(1)$ & $T(1) = T(0) = O(1)$.

50. Which of the following statements about primary key in a database table is true ?

(A) A table can have multiple primary keys.
(B) A primary key uniquely identifies each record in a table.
(C) Primary keys can contain NULL values.
(D) Primary keys are used to establish relationships between tables.

51. Which of the following data structure is required to convert an arithmetic expression in infix form to its equivalent postfix form ?

(A) Queue
(B) Linked List
(C) Binary Search Tree
(D) Stack

52. Which is the correct statement about operator overloading ?

(A) Only arithmetic operators can be overloaded.

(B) Only non-arithmetic operators can be overloaded.

(C) Precedence of operators are changed after overloading.

(D) Associativity and precedence of operators does not change.

53. A clustering index is defined on the fields which are of types

(A) Non-key and ordering

(B) Non-key and non-ordering

(C) Key and ordering

(D) Key and non-ordering

54. Suppose the numbers 7, 5, 1, 8, 3, 6, 0, 9, 4, 2 are inserted in that order into an initially empty binary search tree. The binary search tree uses usual ordering on natural numbers. What is the in-order traversal sequence of the resultant tree ?

(A) 7, 5, 1, 0, 3, 2, 4, 6, 8, 9

(B) 0, 2, 4, 3, 1, 6, 5, 9, 8, 7

(C) 0, 1, 2, 3, 4, 5, 6, 7, 8, 9

(D) 9, 8, 6, 4, 2, 3, 0, 1, 5, 7

55. Which of the following is popular for applications such as storage of log files in a database management system since it offers the best write performance ?

(A) RAID level 0

(B) RAID level 1

(C) RAID level 2

(D) RAID level 3

56. Which of the following statement is correct ?

(A) Pre-order traversal of Binary search gives sorted list.

(B) In-order traversal of Binary search tree gives sorted list.

(C) Post-order traversal of Binary search tree gives sorted list.

(D) None of the above.

57. Which one of the following is deadlock avoidance algorithm ?

(A) Elevator algorithm
(B) Banker's algorithm
(C) LRU algorithm
(D) SCAN algorithm

58. Which command is used to set the three permissions for all the three categories of users of a file ?

(A) chgrp
(B) chown
(C) chmod
(D) chusr

59. Which command is used for printing the current working directory ?

(A) dir
(B) HOME
(C) cd
(D) pwd

60. When several processes access the same data concurrently and the outcome of the execution depends on the particular order in which the access takes place is called _____.

(A) Race condition
(B) Critical condition
(C) Virtual condition
(D) Linear condition

61. *Baud* means

(A) The number of bits transmitted per unit time
(B) The number of bytes transmitted per unit time
(C) The rate at which the signal changes
(D) None of the above

62. Which option will be used with sort command to start sorting after the n^{th} column of the $(m + 1)^{th}$ field ?

(A) $-m \cdot n$
(B) $+m \cdot ln$
(C) $+n \cdot m + 1$
(D) $+(m + 1) \cdot n$

63. Which layer of the OSI model is responsible for routing and forwarding packets ?

(A) Network Layer (Layer 3)
(B) Transport Layer (Layer 4)
(C) Data Link Layer (Layer 2)
(D) Physical Layer (Layer 1)

64. Which command is used for displaying the beginning of a file in Unix ?

(A) lp
(B) begin
(C) pr
(D) head

65. 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.

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

66. What is the result of the following postfix expression ?

ab*cd* + where a=2, b=2, c=3, d=4.

(A) 16
(B) 12
(C) 14
(D) 10

67. Which one of the following does not have a Net ID and Host Id ?

(A) Class A
(B) Class B
(C) Class C
(D) Class D

68. Which command is used to extract specific columns from the file ?

(A) cat
(B) cut
(C) grep
(D) paste

69. In the OSI model, encryption and decryption are functions of the _____.

(A) Transport Layer
(B) Session Layer
(C) Presentation Layer
(D) Application Layer

70. Which of the following is not a communication command ?

(A) write
(B) mesg
(C) mail
(D) grep

71. A deadlock avoidance algorithm dynamically examines the _____ to ensure that a circular wait condition can never exist.

(A) Operating system
(B) Resources
(C) System Storage State
(D) Resource Allocation State

72. A Port address in TCP/IP is _____ bits long.

(A) 32
(B) 48
(C) 16
(D) None of the above

73. What is the worst case time complexity of inserting an elements into an empty linear linked list, if it needs to be maintained in sorted order after every insertion ?

(A) $\theta(n)$
(B) $\theta(n \log n)$
(C) $\theta(n^2)$
(D) $\theta(1)$

74. In IPV4 network ID and host ID in class A

(A) 8 bits. network ID, 24 bits host ID.
(B) 24 bits. network ID, 8 bits host ID.
(C) 14 bits. network ID, 16 bits host ID.
(D) 16 bits. network ID, 14 bits host ID.

75. What is the worst case complexity of inserting a node in doubly linked list ?

(A) O(log n)
(B) O(n)
(C) O(n log n)
(D) O(1)

76. Virtual memory is normally implemented by _____.

(A) Demand Paging
(B) Buses
(C) Virtualization
(D) All of the above mentioned methods

77. Which of the following sorting algorithm will be the most efficient if the elements are already in sorted order ?

(A) Bubble sort
(B) Selection sort
(C) Insertion sort
(D) Merge sort

78. _____ server is used to create a secure tunnel connection.

(A) Radius
(B) VPN
(C) Proxy
(D) DNS

79. What is the prefix of the following expression A–B/(C*D^E) ?

(A) –A/B*C^DE
(B) –A/BC*^DE
(C) –ABCD*^DE
(D) –/*^ACBDE

80. Hamming code is used for _____.

(A) Error detection
(B) Error correction
(C) Error encapsulation
(D) Both Error detection and correction

Category-2 (Q. 81 to 100)

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

81. Which of the following(s) are not type of inheritance ?

(A) Hierarchical Inheritance (B) Linear Inheritance

(C) Multilevel Inheritance (D) Distributed Inheritance

82. There are three IP addresses as given below :

X = 202.23.14.150

Y = 168.19.200.12

Z = 72.192.52.210

Which of the following statements is correct ?

(A) X is Class A, Y is class B, Z is class C

(B) X is Class C, Y is class A, Z is class B

(C) X is Class A, Y is class C, Z is class B

(D) X is Class C, Y is class B, Z is class A

83. A process refers to 5 pages namely A, B, C, D and E in the order :

"A, B, C, D, A, B, E, A, B, C, D, E". If the page replacement algorithm is FIFO, the number of page transfers with an empty internal store of 3 frames is _____.

(A) 8 (B) 10

(C) 9 (D) 7

84. What are non-linear data structure ?

(A) Graph (B) Linked List

(C) Queue (D) Tree

85. Relation R has eight attributes ABCDEFGH. Field of R contain only atomic values.

$X = \{CH \rightarrow G, A \rightarrow BC, B \rightarrow CFH, E \rightarrow A, F \rightarrow EG\}$

is a set of Functional Dependencies (FD's) so that F^+ is exactly the set of FD's that hold for R.

How many candidate keys does the relation R have ?

(A) 3 (B) 4

(C) 5 (D) 6

86. What are the valid shells in linux ?

(A) Kernel shell (B) C shell

(C) Vi shell (D) Korn shell

87. What are the valid layers of OSI model ?

(A) Internet layer (B) Transport layer

(C) Data Link layer (D) Session layer

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

(A) 14 (B) 30

(C) 62 (D) 126

89. Identify the incorrect phase of STLC (Software Testing Life Cycle).

(A) Test Closure (B) Coding

(C) Requirement Analysis (D) Test Planning

90. For which one of the following reasons does Internet Protocol (IP) use the time-to-live (TTL) field in the IP datagram header ?

(A) Ensure packets reach destination within that time.

(B) Discard packets that reach later than that time.

(C) Prevent packets from looping indefinitely.

(D) Limit the time for which a packet gets queued in intermediate router.

91. Which of the following is not supervised learning ?

(A) PCA

(B) Naive Bayesian

(C) Linear Regression

(D) Decision Tree

92. Which of the following statements is not true about the pruning in the decision tree ?

(A) When the decision tree is created, many of the branches will reflect anomalies in the training data due to noise.

(B) The over fitting happens when the learning algorithm continues to develop hypothesis that reduce training set error at the cost of increased test set errors.

(C) It optimizes the computational efficiency.

(D) It reduces the classification accuracy.

93. If 2 classes derive one base class and redefine a function of base class, also overload some operators inside class body. Among these two things of function and operator overloading, where is polymorphism used ?

(A) Function overloading only

(B) Operator overloading only

(C) Both (A) and (B) are using polymorphism

(D) Either function overloading or operator overloading because polymorphism can be applied only once in a program

94. What is the output of the following C-program ?

```
#include<stdio.h>
int main( )
{   int a = 20;
    printf ("CINEMA");
    return 1;
    printf ("DINOSAUR");
    return 1;
}
```

(A) CINEMA DINOSAUR
(B) CINEMA
(C) DINOSAUR
(D) Compilation error

95. A CPU generates 32-bit virtual addresses. The page size is 4 KB. The processor has a translation look-aside buffer (TLB) which can hold a total of 128 page table entries and is 4-way set associative. The minimum size of the TLB tag is :

(A) 11 bits
(B) 13 bits
(C) 15 bits
(D) 20 bits

96. Which of the following statements about polymorphism in C++ are correct ?

(A) Polymorphism allows a function to perform different tasks based on the object that invokes it.
(B) C++ supports compile-time polymorphism through function overloading and runtime polymorphism through virtual functions.
(C) Polymorphism is achieved by hiding the implementation details of a class.
(D) In C++, polymorphism can only be achieved through inheritance.

97. What is the return value of f(p, p), if the value of p is initialized to 5 before the call ?

```
int f(int &x, int c) {
c = c – 1;
int (c==0) return 1;
x = x+1;
return f(x, c) * x;
}
```

(A) 3024 (B) 6561

(C) 55440 (D) 161051

98. What could ideally be the optimal page replacement algorithm ?

(A) Replace the page that has not been used for a long time.

(B) Replace the page that has been used for a long time.

(C) Replace the page that will not be used for a long time.

(D) None of the above mentioned policies.

99. If memory access takes 20 ns with cache and 110 ns without cache, then the hit-ratio (cache uses a 10 ns memory) is :

(A) 87% (B) 88%

(C) 90% (D) 93%

100. What is the full form of PERT and CPM in Software Engineering ?

(A) Project Evaluation and Review Technique; Computer Program Management

(B) Program Evaluation and Review Technique; Critical Path Method

(C) Project Execution and Resource Tracking; Code Performance Monitoring

(D) Program Execution and Regression Testing; Continuous Process Modeling

SPACE FOR ROUGH WORK

1