No. of Pages. 20

Code No.	Y – 3064

Register Number :

Name :

Time : 2 Hours

Max.Marks : 100

Entrance Examination for Admission to the M.Tech. Courses in the Teaching Departments, 2026

CSS

COMPUTER SCIENCE WITH SPECIALIZATION IN DIGITAL IMAGE COMPUTING

GENERAL INSTRUCTIONS

1. The Question Paper is having 100 Objective Questions, each carrying one mark.
2. The answers are to be marked **only** in the "**OMR Sheet**" provided.
3. **Negative marking** : **0.25 marks** will be deducted for each wrong answer .

INSTRUCTIONS FOR FILLING THE OMR SHEET

- The OMR sheet should not be folded or crushed.
- Use only blue/black ball point pen to fill the circles.
- Use of pencil is strictly prohibited.
- Circles should be darkened completely and properly.
- Cutting and erasing on this sheet is not allowed.
- Do not leave any stray marks on the sheet.
- Do not use marker or white fluid to hide the mark.
- WRONG METHODS

CORRECT METHOD

DO NOT WRITE HERE

Choose appropriate answer from the options in the questions.

(100 × 1 = 100 marks)

1. The rank of a matrix is equal to _____.

   A. Number of rows

   B. Number of columns

   C. Maximum number of linearly independent rows

   D. Determinant

2. A system is consistent if:

   A. Rank(A) ≠ Rank(A I B)

   B. Rank(A) = Rank(A I B)

   C. Determinant = 0

   D. Variables = 0

3. Eigenvalues of a matrix are solutions of:

   A. $|A - \lambda I| = 0$

   B. $AX = B$

   C. $A^2 = I$

   D. $AX = 0$

4. Two vectors are orthogonal if:

   A. Their sum is zero

   B. Their dot product is zero

   C. Their magnitude is same

   D. They are parallel

5. The derivative of ln(x) is ————————.

   A. x

   B. $\log(x)$

   C. e^x

   D. $1/x$

6. Chain rule is used in ————————.

   A. Integration

   B. Limits

   C. Matrix multiplication

   D. Differentiation of composite functions

7. Jacobian is used for:

   A. Transformation of variables

   B. Integration

   C. Differentiation

   D. Optimization

8. Partial derivatives are used when:

   A. One variable

   B. Multiple variables

   C. No variable

   D. Constant

9. Orthogonal transformation preserves:

A. Area
B. Volume
C. Distance
D. Eigenvalues

10. Triple integrals are used for:

A. Area
B. Length
C. Volume
D. Time

11. A proposition is:

A. A variable
B. A statement with truth value
C. A function
D. A relation

12. Which is a proof technique?

A. Induction
B. Sorting
C. Hashing
D. Searching

13. Equivalence relation is:

A. Reflexive only
B. Symmetric only
C. Reflexive, symmetric, transitive
D. Transitive only

14. Number of permutations of n objects is:

A. $n!$
B. n^2
C. $n \log n$
D. n

15. Pigeonhole principle applies to:

A. Sorting
B. Allocation problems
C. Graphs
D. Trees

16. A tree with n vertices has ———————— edges.

A. n
B. $n - 1$
C. $n + 1$
D. n^2

17. BFS is used for:

A. Shortest path
B. Sorting
C. Searching array
D. Compilation

18. A group requires:

A. Closure
B. Identity
C. Inverse
D. All

19. A lattice is:

A. Graph
B. Algebraic structure
C. Tree
D. Relation

20. Connected graph means:

A. Cycles exist
B. Weighted
C. Directed
D. All vertices reachable

21. sizeof(int) depends on:

A. Compiler
B. OS
C. Hardware
D. All

22. What will be the output?

```
#include <stdio.h>
int main() {
int arr [ ]= {10, 20, 30};
int *p = arr;
printf("%d", *(p + 1));
return 0;
}
```

A. 10
B. 20
C. 30
D. Error

23. What is a common issue if dynamically allocated memory using malloc() is not freed?

A. Stack overflow
B. Memory leak
C. Syntax error
D. Compilation error

24. Recursion uses:

A. Queue
B. Stack
C. Heap
D. Array

25. File handling is done using:

A. fopen()
B. scanf()
C. printf()
D. sizeof()

26. Encapsulation means:

A. Data hiding
B. Inheritance
C. Abstraction
D. Polymorphism

27. In heritance enables:

A. Code reuse
B. Compilation
C. Execution
D. Storage

28. Method overriding occurs at:

A. Compile time
B. Runtime
C. Linking
D. Loading

29. Java supports multithreading using:

A. Thread class
B. Scanner
C. File
D. Buffer

30. Interface provides:

A. Implementation
B. Abstraction
C. Storage
D. Compilation

31. Queue follows ——————.

A. LIFO
B. FIFO
C. Random
D. Priority

32. Stack operations are:

A. Push/Pop
B. Insert/ Delete
C. Add/Remove
D. Search

33. In order traversal of BST gives:

A. Sorted order
B. Reverse
C. Random
D. None

34. AVL tree is:

A. Balanced
B. Unbalanced
C. Heap
D. Graph

35. Which data structure is used to implement recursion?

A. Queue
B. Heap
C. Stack
D. Graph

36. DFS uses:

A. Queue
B. Stack
C. Array
D. Heap

37. Hashing reduces:

A. Sorting time
B. Search time
C. Space
D. Memory

38. Quick sort average complexity:

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

39. Binary tree max nodes at level 1:

A. 2^1 B. I^2

C. 1 D. log 1

40. Complexity analysis measures:

A. Space/time B. Data

C. Input D. Output

41. Analog communication uses ————————

A. Continuous signals B. Discrete signals

C. Binary signals D. Digital pulses

42. Modulation is used for:

A. Error correction B. Signal transmission

C. Compression D. Encryption

43. CRC is used for?

A. Compression B. Error detection

C. Encryption D. Routing

44. TCP/IP model has ————————.

A. 4 layers B. 5 layers

C. 6 layers D. 7 layers

45. Multiplexing is used to:

A. Increase bandwidth B. Share channel

C. Reduce noise D. Encode data

46. A project team decides to revisit requirements after user feedback during development. Which SDLC model best supports this approach?

A. Waterfall Model B. Agile Model

C. Spiral Model D. V-Model

47. What is the primary purpose of version control systems in software development?

A. To compile programs

B. To test software

C. To track and manage changes in source code

D. To design user interfaces

48. UML diagrams are used in:

A. Coding

B. Debugging

C. Testing

D. Design

49. Which of the following best improves maintainability and reusability in software design?

A. Tight coupling between modules

B. High cohesion within modules

C. Large monolithic functions

D. Frequent global variable usage

50. Software quality assurance ensures:

A. Reliability

B. Speed

C. Size

D. Memory

51. An intelligent agent:

A. Acts randomly

B. Stores data

C. Perceives and acts

D. Executes code

52. BFS uses:

A. Stack

B. Queue

C. Heap

D. Tree

53. A *algorithm uses* *

A. Heuristics
B. Sorting
C. Searching
D. Compilation

54. Knowledge representation deals with:

A. Data storage
B. Encoding knowledge
C. Memory
D. Hardware

55. Inference is:

A. Storage
B. Output
C. Input
D. Deduction

56. Which technique is commonly used in NLP to convert text into numerical form for processing?

A. Tokenization
B. Vectorization
C. Stemming
D. Encription

57. Expert systems use:

A. Rules
B. Arrays
C. Graphs
D. Trees

58. Which layer of the OSI model is responsible for end to end communication?

A. Network layer
B. Data link layer
C. Transport layer
D. Session layer

59. Planning in AI is:

A. Random
B. Goal-directed
C. Static
D. Fixed

60. Heuristic function estimates:
    A. Cost to goal
    B. Path
    C. Distance
    D. Node

61. Supervised learning requires:
    A. No data
    B. Unlabelled data
    C. Random data
    D. Labelled data

62. Regression predicts:
    A. Classes
    B. Rules
    C. Clusters
    D. Continuous values

63. Which task is commonly performed using unsupervised learning?
    A. Image Classification
    B. Customer segmentation
    C. Spam detection
    D. Regression

64. PCA is primarily used for:
    A. Classification
    B. Regression
    C. Clustering
    D. Dimensionality reduction

65. Overfitting occurs when:
    A. Model too complex
    B. Model too simple
    C. Less data
    D. More noise

66. Regularization helps to:
    A. Reduce overfitting
    B. Overfit
    C. Increase data
    D. Remove data

67. Which component introduces non-linearity in a neural network?
    A. Bias
    B. Layers
    C. Weights
    D. Activation function

68. Bias-variance *tradeoff* deals with:
    A. Error balance
    B. Speed
    C. Memory
    D. Data

69. Feature engineering improves:
    A. Accuracy
    B. Memory
    C. Speed
    D. Storage

70. Validation is used for:
    A. Training
    B. Testing model
    C. Coding
    D. Input

71. Process scheduling decides:
    A. Execution order
    B. Memory
    C. Files
    D. Input

72. How many necessary conditions must be satisfied for a deadlock to occur?
    A. One condition
    B. Two
    C. Four
    D. Five

73. Paging avoids:
    A. External fragmentation
    B. Internal fragmentation
    C. Memory loss
    D. Errors

74. Virtual memory uses:

A. RAM

B. Disk

C. Cache

D. CPU

75. Thread is:

A. Process

B. File

C. Program

D. Lightweight process

76. File system manages:

A. Memory

B. Files

C. CPU

D. Input

77. Context switching is:

A. Process change

B. Memory change

C. Disk change

D. Input

78. Semaphore is used for:

A. Memory

B. Synchronization

C. Storage

D. Files

79. Segmentation is:

A. Fixed

B. Variable

C. Static

D. Constant

80. Scheduling algorithm example:

A. FCFS

B. BFS

C. DFS

D. A^*

81. ER model represents:

A. Data

B. Relationships

C. Both (A) and (B)

D. None

82. Which of the following is a key characteristic of NoSQL databases?

A. Schema flexibility

B. Fixed schema

C. Vertical Scaling

D. Strict ACID compliance

83. 1NF removes:

A. Redundancy

B. Repeating groups

C. Keys

D. Tables

84. BCNF is stronger than:

A. 1NF

B. 2NF

C. 3NF

D. 4NF

85. A database transaction adheres to:

A. Speed

B. ACID properties

C. Size

D. Storage

86. Concurrency control prevents:

A. Deadlock

B. Delay

C. Loss

D. Inconsistency

87. Indexing improves:

A. Storage

B. Retrieval speed

C. Memory

D. Data

88. Join operation combines:

A. Rows

B. Fields

C. Columns

D. Data

89. Which key enforces referential integrity between two related tables?

A. Foreign key

B. Candidate key

C. Super key

D. Primary key

90. Which SQL command removes all records from a table but retains its structure?

A. DELETE

B. CLEAR

C. TRUNCATE

D. REMOVE

91. Time complexity measures:

A. Speed

B. Memory

C. Time taken

D. Input

92. Which of the following algorithms is the most efficient for large input sizes?

A. O(n log n)

B. $O(n^2)$

C. $O(n^3)$

D. $O(2^n)$

93. Divide and conquer splits:

A. Data

B. Output

C. Memory

D. Problem

94. Greedy algorithm makes:

A. Global choice
B. Local optimal choice
C. Random
D. Worst

95. Dynamic programming uses:

A. Recursion
B. Storing intermediate results
C. Iteration
D. All

96. Backtracking is used in:

A. Sorting
B. Optimization
C. Searching
D. Problems with constraints

97. Which of the following is always true?

A. NP $\subset$ P
B. P $\subset$ NP
C. NP-hard $\subset$ P
D. NP-complete $\subset$ P

98. What happens to the performance of binary search if the dataset size doubles?

A. Time increases logarithmically
B. Time increases exponentially
C. Time doubles
D. Time remains constant

99. Merge sort complexity:

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

100. Branch and bound is used for:

A. Sorting
B. Optimization
C. Searching
D. Traversal

ROUGH WORK

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