

Booklet Serial No.

Signature Invigilator

Maulana Azad National Urdu University
Master of Technology (Computer Science)
Entrance Test May 2026
Question Paper cum Answer Script

Hall Ticket No.

OMR Serial No.

Time: 2hrs

Maximum Marks: 100

INSTRUCTIONS FOR CANDIDATES

1. Candidate should write their Hall Ticket number and OMR serial number on the space provided above. Candidate should not write their Name, Hall Ticket number and OMR Serial Number at any other place.
2. This booklet contains **(40)** pages. The Candidate should check the booklet before taking the Test. In case of any discrepancy, a new booklet may be provided by the Invigilator.
3. The question booklet contains 100 Multiple Choice Questions. For each question there are four options, (A), (B), (C), (D). The candidate is required to choose the correct answer and darken the circle with blue / black ballpoint pen in the OMR sheet against the corresponding answer.
4. If the candidate does not bubble the correct answer against the corresponding question number in the OMR sheet, they will not get marks.
5. If the candidate bubbles more than one circle in OMR Sheet for any question, marks shall not be awarded for the question.
6. There are no Negative marks.
7. At the end of Entrance Test, candidates are allowed to take their question booklet

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1. Which data structure uses FIFO (First In First Out) principle?
(A) Stack (B) Queue
(C) Tree (D) Graph
2. What is the time complexity of binary search in the worst case?
(A) $O(n)$ (B) $O(\log n)$
(C) $O(n \log n)$ (D) $O(1)$
3. Which of the following data structures is used for recursion implementation?
(A) Queue (B) Heap
(C) Linked List (D) Stack
4. Which sorting algorithm has the best average-case time complexity?
(A) Bubble Sort (B) Selection Sort
(C) Merge Sort (D) Insertion Sort
5. Which of the following is not a linear data structure?
(A) Array (B) Linked List
(C) Stack (D) Tree
6. Which data structure is best suited for priority scheduling?
(A) Queue (B) Stack
(C) Heap (D) Linked List
7. Which hashing technique resolves collision using linked lists?
(A) Chaining (B) Quadratic Probing
(C) Linear Probing (D) Double Hashing
8. Assertion (A): BFS always finds the optimal solution.
Reason (R): BFS explores nodes level by level.
(A) Both A and R are true, and R is the correct explanation of A
(B) Both A and R are true, but R is NOT the correct explanation of A
(C) A is true, but R is false
(D) A is false, but R is true

9. Match List-I and List-II

List-I	List-II
a. Stack	(i) FIFO
b. Queue	(ii) LIFO
c. Tree	(iii) Hierarchical
d. Graph	(iv) Network

- (A) a-(ii), b-(iii), c-(i), d-(iv)
 (B) a-(i), b-(ii), c-(iii), d-(iv)
 (C) a-(ii), b-(i), c-(iii), d-(iv)
 (D) a-(i), b-(iii), c-(ii), d-(iv)

10. Assertion (A): Stack follows LIFO principle.

Reason (R): The last inserted element is the first to be removed.

- (A) Both A and R are true, and R is the correct explanation of A
 (B) Both A and R are true, but R is NOT the correct explanation of A
 (C) A is true, but R is false
 (D) A is false, but R is true

11. Which scheduling algorithm is non-preemptive?

- (A) Round Robin (B) Shortest Remaining Time First
 (C) Priority Scheduling (D) First Come First Serve

12. The time taken to switch from one process to another is called:

- (A) Waiting Time (B) Turnaround Time
 (C) Context Switching Time (D) Response Time

13. Which memory is fastest?

- (A) RAM (B) Cache
 (C) Hard Disk (D) Optical Disk

14. Which of the following is a page replacement algorithm?

- (A) FCFS (B) LRU
 (C) Round Robin (D) SJF

15. Which of the following causes thrashing?
 (A) High CPU utilization (B) Low paging activity
 (C) Excessive paging (D) Low multiprogramming
16. Which system call is used to create a new process in Unix/Linux?
 (A) exec() (B) exit()
 (C) wait() (D) fork()
17. Which of the following is a synchronization tool?
 (A) Semaphore (B) Compiler
 (C) Loader (D) Assembler
18. In paging, logical address is divided into:
 (A) Segment number and offset (B) Page number and offset
 (C) Block number and word (D) Frame number and offset
19. Match List-I and List-II

List-I	List-II
a. Deadlock	(i) Infinite waiting
b. Starvation	(ii) Circular wait
c. Thrashing	(iii) Excess paging
d. Context Switch	(iv) Process change

- (A) a-(ii), b-(i), c-(iii), d-(iv) (B) a-(i), b-(ii), c-(iii), d-(iv)
 (C) a-(iii), b-(ii), c-(i), d-(iv) (D) a-(ii), b-(iii), c-(i), d-(iv)
20. Assertion (A): Deadlock occurs when processes wait indefinitely.
 Reason (R): Circular wait is one of the necessary conditions for deadlock.
 (A) Both A and R are true, and R is the correct explanation of A
 (B) Both A and R are true, but R is NOT the correct explanation of A
 (C) A is true, but R is false
 (D) A is false, but R is true
21. Which topology connects all devices to a central hub?
 (A) Bus (B) Ring
 (C) Star (D) Mesh

22. Which layer handles IP addressing and routing?
 (A) Network Layer (B) Transport Layer
 (C) Application Layer (D) Physical Layer
23. Which protocol translates domain names into IP addresses?
 (A) DHCP (B) ICMP
 (C) ARP (D) DNS
24. Which device is used to connect different networks?
 (A) Switch (B) Hub
 (C) Bridge (D) Router
25. Which of the following is a connection-oriented protocol?
 (A) TCP (B) IP
 (C) UDP (D) ICMP
26. What is the size of an IPv4 address?
 (A) 16 bits (B) 128 bits
 (C) 64 bits (D) 32 bits
27. What is the default port number of HTTP?
 (A) 21 (B) 25
 (C) 80 (D) 110
28. Match List-I and List-II

List-I	List-II
a. HTTP	(i) Email sending
b. FTP	(ii) File transfer
c. SMTP	(iii) Web browsing
d. DNS	(iv) Name resolution

- (A) a-(iii), b-(ii), c-(i), d-(iv) (B) a-(ii), b-(iii), c-(i), d-(iv)
 (C) a-(iii), b-(i), c-(ii), d-(iv) (D) a-(i), b-(ii), c-(iii), d-(iv)

29. Assertion (A): UDP provides reliable data transfer.

Reason (R): UDP is a connectionless protocol.

- (A) Both A and R are true, and R is the correct explanation of A
- (B) Both A and R are true, but R is NOT the correct explanation of A
- (C) A is true, but R is false
- (D) A is false, but R is true

30. A data packet of size 1000 bytes is transmitted over a link of bandwidth 1 Mbps.

Find the transmission delay.

- (A) 8 ms
- (B) 1 ms
- (C) 0.008ms
- (D) 0.08 ms

31. Which of the following is a relational database?

- (A) MongoDB
- (B) Redis
- (C) Cassandra
- (D) MySQL

32. Which normal form removes partial dependency?

- (A) 1NF
- (B) 2NF
- (C) 3NF
- (D) BCNF

33. Which operation is used to combine rows from two tables?

- (A) UNION
- (B) DIFFERENCE
- (C) INTERSECT
- (D) JOIN

34. Which level of abstraction describes what data is stored?

- (A) Logical Level
- (B) Physical Level
- (C) View Level
- (D) Internal Level

35. Which transaction property ensures that either all operations occur or none occur?

- (A) Consistency
- (B) Isolation
- (C) Atomicity
- (D) Durability

36. Which concurrency control technique uses locking mechanisms?

- (A) Timestamp Ordering (B) Two-Phase Locking
(C) Multi-versioning (D) Deadlock Prevention

37. Which index structure is commonly used in databases?

- (A) Stack (B) Queue
(C) B+ Tree (D) Linked List

38. What is the result of the relational algebra expression:

$\pi_{\text{name}} (\sigma_{\text{age} > 20} (\text{Student}))$?

- (A) All attributes of Student
(B) Names of students with age > 20
(C) Ages of students
(D) Students of age < 20

39. Match List-I and List-II

List-I	List-II
a. Primary Key	(i) Uniquely identifies tuple
b. Foreign Key	(ii) References another table
c. Candidate Key	(iii) Minimal super key
d. Super Key	(iv) May have extra attributes

- (A) a-(i), b-(ii), c-(iii), d-(iv) (B) a-(ii), b-(i), c-(iii), d-(iv)
(C) a-(i), b-(iii), c-(ii), d-(iv) (D) a-(iii), b-(ii), c-(i), d-(iv)

40. Assertion (A): Every super key is a candidate key.

Reason (R): Candidate key is a minimal super key.

- (A) Both A and R are true, and R is the correct explanation of A
(B) Both A and R are true, but R is NOT the correct explanation of A
(C) A is true, but R is false
(D) A is false, but R is true

41. A graph with no cycles is called:

- (A) Complete Graph (B) Bipartite Graph
(C) Tree (D) Directed Graph

42. In how many ways can 3 elements be arranged?
 (A) 6 (B) 3
 (C) 9 (D) 12
43. Which of the following is used in linear programming?
 (A) Stack (B) Queue
 (C) Simplex Method (D) Binary Tree
44. Which of the following is logically equivalent to $p \rightarrow q$?
 (A) $\neg p \rightarrow \neg q$ (B) $\neg q \rightarrow \neg p$
 (C) $p \wedge q$ (D) $p \vee q$
45. Which of the following is a binary operation?
 (A) $f: A \times A \rightarrow A$ (B) $f: A \rightarrow B$
 (C) $f: A \rightarrow A \times A$ (D) $f: B \rightarrow A$
46. Which relation is reflexive, symmetric, and transitive?
 (A) Partial Order (B) Equivalence Relation
 (C) Function (D) Mapping
47. Which of the following is a tautology?
 (A) $p \wedge \neg p$ (B) $p \wedge q$
 (C) $p \rightarrow q$ (D) $p \vee \neg p$

48. Match List-I and List-II

List-I	List-II
a. Reflexive	(i) $(a,b),(b,c) \Rightarrow (a,c)$
b. Symmetric	(ii) $(a,b) \Rightarrow (b,a)$
c. Transitive	(iii) $(a,a) \in R$
d. Antisymmetric	(iv) $a=b$ if both hold

- (A) a-(iii), b-(ii), c-(i), d-(iv) (B) a-(ii), b-(i), c-(iii), d-(iv)
 (C) a-(i), b-(iii), c-(ii), d-(iv) (D) a-(i), b-(ii), c-(iii), d-(iv)

49. How many ways can 5 distinct objects be arranged such that 2 specific objects are always together?
- (A) 24 (B) 48
(C) 72 (D) 120
50. Belady's anomaly is observed in:
- (A) LRU only (B) Optimal only
(C) FIFO only (D) All algorithms
51. Which addressing mode uses a constant value as an operand?
- (A) Immediate (B) Direct
(C) Indirect (D) Indexed
52. Which of the following is simplified form of given function
 $f(A,B,C) = \sum m(0,1,3,7)$
- (A) $A'B'C' + A'B'C + A'BC + ABC$ (B) $A'B'C + A'BC + ABC$
(C) $A'B' + BC'$ (D) $A'B' + BC$
53. What is the effective memory access time (EMAT) formula for cache memory?
- (A) Hit Ratio $\times$ Hit Time
(B) Miss Ratio $\times$ Miss Penalty
(C) Hit Time + Miss Rate $\times$ Miss Penalty
(D) Miss Time – Hit Time
54. Which memory mapping technique allows a block to be placed anywhere in cache?
- (A) Direct Mapping (B) Fully Associative Mapping
(C) Set Associative Mapping (D) Sequential Mapping
55. What is the instruction cycle sequence?
- (A) Execute $\rightarrow$ Decode $\rightarrow$ Fetch (B) Fetch $\rightarrow$ Execute $\rightarrow$ Decode
(C) Fetch $\rightarrow$ Decode $\rightarrow$ Execute (D) Decode $\rightarrow$ Fetch $\rightarrow$ Execute

56. A system has a cache memory with hit time = 1 ns, miss penalty = 100 ns, and hit ratio = 0.95. What is the Effective Memory Access Time (EMAT)?
- (A) 1 ns (B) 5 ns
(C) 10 ns (D) 6 ns
57. A pipeline has 4 stages, each taking 5 ns.
What is the total time required to execute 10 instructions?
- (A) 65 ns (B) 50 ns
(C) 80 ns (D) 100 ns
58. A processor executes instructions with the following distribution:
40% with CPI = 1
40% with CPI = 2
20% with CPI = 3
What is the average CPI?
- (A) 1.5 (B) 1.8
(C) 2.0 (D) 2.2
59. Given a schedule:
R1(X), R2(X), W1(X), W2(X)
Is the schedule conflict serializable?
- (A) Yes (B) No
(C) Cannot determine (D) Only view serializable
60. If $f(n) = g(n) + h(n)$, and $h(n) = 0$, then A^* behaves like:
- (A) DFS (B) BFS
(C) Uniform Cost Search (D) Greedy
61. Which model is iterative and incremental?
- (A) Spiral (B) Waterfall
(C) Big Bang (D) V-Model
62. Which document describes system requirements?
- (A) Flowchart (B) DFD
(C) ER Diagram (D) SRS

63. Which of the following is a black-box testing technique?
- (A) Path Testing (B) Statement Coverage
(C) Equivalence Partitioning (D) Loop Testing
64. Which metric is used to measure software complexity?
- (A) Halstead Metric (B) LOC
(C) Function Point (D) Cyclomatic Complexity
65. Which diagram is used to represent data flow?
- (A) ER Diagram (B) DFD
(C) Use Case Diagram (D) Class Diagram
66. Which of the following is a functional requirement?
- (A) Performance (B) Security
(C) User authentication (D) Reliability
67. In Agile methodology, a short development cycle is called:
- (A) Sprint (B) Phase
(C) Module (D) Iteration
68. Which type of maintenance involves enhancing system functionality?
- (A) Corrective (B) Adaptive
(C) Perfective (D) Preventive
69. Assertion (A): Waterfall model supports frequent requirement changes.
Reason (R): It follows a sequential development process.
- (A) Both A and R are true, and R is the correct explanation of A
(B) Both A and R are true, but R is NOT the correct explanation of A
(C) A is true, but R is false
(D) A is false, but R is true

70. Match List-I and List-II

List-I	List-II
a. Waterfall	(i) Sequential
b. Spiral	(ii) Risk analysis
c. Agile	(iii) Iterative
d. Prototype	(iv) Early model

- (A) a-(i), b-(ii), c-(iii), d-(iv) (B) a-(ii), b-(i), c-(iii), d-(iv)
 (C) a-(i), b-(iii), c-(ii), d-(iv) (D) a-(iii), b-(ii), c-(i), d-(iv)

71. Which memory is used for dynamic allocation in C?

- (A) Stack (B) Heap
 (C) Register (D) Cache

72. Which of the following is a graphics input device?

- (A) Printer (B) Plotter
 (C) Mouse (D) Speaker

73. Which algorithm is used to draw a line in computer graphics?

- (A) Dijkstra's Algorithm (B) Bresenham's Algorithm
 (C) Kruskal's Algorithm (D) Prim's Algorithm

74. Which coordinate system is used in computer graphics?

- (A) Polar (B) Octal
 (C) Binary (D) Cartesian

75. Which transformation is used to change size of an object?

- (A) Scaling (B) Translation
 (C) Rotation (D) Reflection

76. Which parsing technique is top-down?

- (A) Recursive Descent Parsing (B) Shift-Reduce Parsing
 (C) LR Parsing (D) Operator Precedence Parsing

77. In computer graphics, the window-to-viewport transformation is used for:

- (A) Clipping (B) Mapping coordinates
 (C) Shading (D) Rendering

78. Which feature allows a function to call itself?
(A) Recursion (B) Iteration
(C) Overloading (D) Inheritance
79. Which of the following refers to systematic error in research?
(A) Standard Error (B) Variance
(C) Random Error (D) Bias
80. Which of the following represents secondary data?
(A) Interview (B) Observation
(C) Published Report (D) Questionnaire
81. Which symbol is used for comments in Python?
(A) // (B) #
(C) /* */ (D) <!-- -- >
82. Which method is the entry point of a Java program?
(A) start() (B) init()
(C) run() (D) main()
83. Which Python data type is immutable?
(A) Tuple (B) Dictionary
(C) Set (D) List
84. Which Java concept ensures that only one instance of a class exists?
(A) Inheritance (B) Abstraction
(C) Polymorphism (D) Singleton
85. Which keyword is used for exception handling?
(A) catch (B) try
(C) throw (D) error
86. Which HTML attribute specifies the URL of a link?
(A) src (B) action
(C) link (D) href

87. Which language is primarily used for server-side scripting?
- (A) Python (B) CSS
(C) Java (D) HTML
88. Which normal form is used for removal of left recursion?
- (A) Chomsky Normal Form (B) Backus-Naur Form
(C) Greibach Normal Form (D) Regular Form
89. Which class of languages is closed under union, concatenation, and Kleene star?
- (A) Context-Free Languages (B) Context-Sensitive Languages
(C) Recursive Languages (D) Regular Languages
90. Which compiler phase generates intermediate code?
- (A) Lexical Analysis (B) Syntax Analysis
(C) Intermediate Code Generation (D) Semantic Analysis
91. Which language is accepted by a Turing Machine?
- (A) Regular (B) Recursive Enumerable
(C) Context-Free (D) Finite
92. Which of the following is a regular expression operator?
- (A) $\wedge$ (B) $\rightarrow$
(C) $*$ (D) $\forall$
93. Which grammar generates context-free languages?
- (A) Type 0 (B) Type 1
(C) Type 2 (D) Type 3
94. Which problem-solving technique uses trial and error with feedback?
- (A) Reinforcement Learning (B) Dynamic Programming
(C) Greedy Algorithm (D) Divide and Conquer

95. Which type of learning uses labeled data?
- (A) Unsupervised Learning (B) Supervised Learning
(C) Reinforcement Learning (D) Semi-supervised Learning
96. Which of the following is an example of AI application?
- (A) Text Editor (B) Compiler
(C) File System (D) Speech Recognition
97. Artificial Intelligence is concerned with:
- (A) Making machines intelligent (B) Human biology
(C) Database storage (D) Networking
98. Which component stores facts and rules in an expert system?
- (A) Inference Engine (B) Compiler
(C) User Interface (D) Knowledge Base
99. Which measure indicates the strength and direction of relationship between variables?
- (A) Mean (B) Variance
(C) Correlation (D) Mode
100. Research is defined as:
- (A) Searching information (B) Systematic investigation
(C) Data collection only (D) Experimentation only

Rough Work

Rough Work

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