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QUESTION BOOKLET – ADVANCED TEST FOR RECRUITMENT TO TECHNICAL CADRE POSTS

Post:	Sr. Technician
Department	Chemical Engineering
Advt.:	01/2026 dated 09.01.2026
Date of Exam:	09-08-2026
Duration:	2 Hours
Total Marks:	200 (100 Q X 2 M each)
No. of Questions:	100 (MCQs)
Negative Marking:	1/4th mark for every wrong answer

INSTRUCTIONS TO THE CANDIDATES

1. This is an Advanced Test comprising 100 Multiple Choice Questions (MCQs), to be conducted in MCQ mode only.
2. The duration of the test is 2 hours.
3. Answers must be marked on the OMR Answer Sheet using a blue or black ballpoint pen only. Use of pencils is not permitted.
4. Candidates must write/mark their Roll Number, Post applied for, and other required details in the designated space on the OMR Answer Sheet.
5. Answers marked on the Question Booklet or on any sheet other than the OMR Answer Sheet will not be evaluated.
6. For each question, darken the circle corresponding to the correct answer completely and clearly on the OMR Answer Sheet.
7. Each question carries equal marks. There will be a negative marking of ¼ th mark for every wrong answer. No marks will be deducted for questions not attempted.
8. Mark only one answer for each question. Marking more than one circle for a question will be treated as a wrong answer.
9. Overwriting, cutting, or erasing that leaves the OMR Answer Sheet unclear may result in the answer not being evaluated.
10. No candidate shall leave the examination hall during the test.
11. Any attempt to copy, use unfair means, or communicate with others will result in immediate disqualification.
12. The use of electronic gadgets, calculators, mobile phones, smart watches, or any written/printed material is strictly prohibited.
13. Rough work, if any, should be done only on the separate sheet provided for the purpose.
14. Ensure that the OMR Answer Sheet is duly filled and handed over to the Invigilator before leaving the examination hall.
15. Failure to submit the OMR Answer Sheet will result in cancellation of candidature.
16. All material provided, including rough sheets, must be returned before leaving the examination hall.

Q1. Which of the following best describes encapsulation?
A. Combining data and methods into one unit
B. Removing all errors
C. Storing data in files
D. Using only loops

Q2. What is the output of the following C program?

```
#include <stdio.h>
  int main() {
   int a = 17, b = 5;
   printf("%d", (a % b) + (a / b) * 2);
    return 0 }
```

A. 8
B. 11
C. 5
D. 9

Q3. Which control structure executes one block when a condition is true and another when it is false?
A. for
B. switch
C. if-else
D. goto

Q4. Why should repeated statements be placed in a function?
A. Increase size
B. Improve reusability
C. Remove variables
D. Faster execution always

Q5. Which concept stores marks of 60 students efficiently?
A. Structure
B. Array
C. Pointer
D. Function

Q6. A switch primarily operates at which OSI layer?
A. Physical
B. Data Link
C. Network
D. Transport

Q7. In Object-Oriented Programming (OOP), a class serves as a blueprint for creating entities that have their own data and behavior. What are the individual entities created from a class called?
A. Methods
B. Objects
C. Constructors
D. Data types

Q8. A software developer wants to avoid rewriting common features such as startEngine() and stopEngine() for multiple vehicle types. Instead, these common features are defined once and reused by classes such as Car and Bus. Which OOP concept makes this possible?
A. Encapsulation
B. Inheritance
C. Polymorphism
D. Abstraction

Q9. Browser Back button is implemented using:
A. Queue
B. Stack
C. Binary Tree
D. Linked List

Q10. Which SQL statement retrieves all columns for students belonging to the 'CSE' department?
A. SELECT * FROM Student WHERE Department = 'CSE';
B. SELECT Department = 'CSE' FROM Student;
C. DISPLAY * FROM Student WHERE Department = 'CSE';
D. GET * FROM Student WHERE Department = 'CSE';

Q11. A C++ class contains a special member function that is automatically called whenever an object of the class is created. Which member function performs this task?
A. Destructor
B. Constructor
C. Friend Function
D. Inline Function

Q12. Which feature of object-oriented programming allows the same function name to perform different tasks depending on the parameters supplied?
A. Encapsulation
B. Inheritance
C. Function Overloading
D. Abstraction

Q13. Which data structure is most suitable for efficiently retrieving the element with the highest priority from a collection?
A. Stack
B. Heap
C. Tree
D. Graph

Q14. A programmer needs to quickly locate a student's roll number in a list containing 10,000 roll numbers arranged in ascending order. Which searching algorithm would be the most efficient?
A. Linear Search
B. Sequential Search
C. Binary Search
D. Hash Search

Q15. A database designer wants to eliminate redundant data and improve data integrity by organizing tables properly. Which process should be applied?
A. Indexing
B. Normalization
C. Sorting
D. Encryption

Q16. Which SQL clause is used to display only those rows that satisfy a specified condition?
A. ORDER BY
B. GROUP BY
C. WHERE
D. HAVING

Q17. Which of the following system software is responsible for managing computer hardware resources and providing services to application programs?
A. Compiler
B. Operating System
C. Assembler
D. Text Editor

Q18. Which Linux command is used to display the contents of a file?
A. ls
B. cat
C. pwd
D. mkdir

Q19. At the Transport layer of the OSI model, data is encapsulated into which form?
A. Frame
B. Packet
C. Segment
D. Bit

Q20. Which type of address is used for communication within the same local area network (LAN)?
A. IP Address
B. MAC Address
C. Domain Name
D. URL

Q21. Which feature of arrays allows constant-time access to any element using its index?
A. Dynamic memory allocation
B. Pointer dereferencing
C. Contiguous memory allocation
D. Function overloading

Q22. What is the primary advantage of passing an array to a function by reference (address)?
A. It copies the entire array
B. The function can modify the original array
C. It converts the array into a pointer permanently
D. It reduces the array size

Q23. Which OOP principle hides internal implementation details and exposes only essential features?
A. Inheritance
B. Abstraction
C. Polymorphism
D. Aggregation

Q24. Which data structure is most suitable for implementing recursive function calls?
A. Queue
B. Graph
C. Stack
D. Heap

Q25. Which sorting algorithm repeatedly compares adjacent elements and swaps them if they are in the wrong order?
A. Merge Sort
B. Selection Sort
C. Bubble Sort
D. Quick Sort

Q26. Which normal form is achieved when a relation has no partial dependency and every non-key attribute is fully dependent on the primary key?
A. First Normal Form (1NF)
B. Second Normal Form (2NF)
C. Third Normal Form (3NF)
D. Boyce-Codd Normal Form (BCNF)

Q27. Which transaction property ensures that either all operations are completed successfully or none of them are applied?
A. Consistency
B. Isolation
C. Atomicity
D. Durability

Q28. Which CPU scheduling algorithm allocates processor time to each process for a fixed time quantum?
A. FCFS
B. Round Robin
C. SJF
D. Priority

Q29. Which protocol is commonly used by email clients to retrieve emails from a mail server to a local device?
A. SMTP
B. HTTP
C. POP3
D. FTP

Q30. Which cybersecurity attack attempts to guess a user's password by systematically trying many possible combinations?
A. Phishing
B. Spoofing
C. Brute-force attack
D. Sniffing

Q31. What will be the output of the following C code segment?

```
int x = 10;
int *p = &x;
*p = 20;
printf("%d", x);
```

A. 10
B. 20
C. Garbage value
D. Compilation Error

Q32. Which pointer declaration correctly defines a pointer to an integer variable?
A. int p;
B. *int p;
C. int *p;
D. pointer int p;

Q33. Which keyword is used in C++ to create an object dynamically?
A. create
B. malloc
C. alloc
D. new

Q34. What is the time complexity of inserting an element into a binary heap containing *n* elements?
A. O(1)
B. O(n)
C. O(log n)
D. $O(n^2)$

Q35. What is the maximum number of swaps performed by Selection Sort for an array of n elements?
A. n
B. n − 1
C. n(n−1)/2
D. log n

Q36. A database administrator wants to add a new column or change the definition of an existing column in a table. Which SQL command should be used?
A. UPDATE
B. MODIFY
C. ALTER
D. CHANGE

Q37. Which memory management technique allows a process to use more memory than the available physical RAM?
A. Segmentation
B. Paging
C. Virtual Memory
D. Swapping

Q38. Which Linux command is used to create a new directory?
A. cd
B. pwd
C. mkdir
D. ls

Q39. Which device operates at the Data Link layer and forwards frames using MAC addresses?
A. Router
B. Hub
C. Switch
D. Gateway

Q40. Which protocol automatically assigns IP addresses to devices on a network?
A. DNS
B. DHCP
C. FTP
D. SMTP

Q41. A function needs to count how many times it has been called without using a global variable. Which type of variable is most suitable?
A. auto variable
B. register variable
C. static local variable
D. extern variable

Q42. Which operator is used to access members of an object through a pointer in C++?
A. .
B. ->
C. ::
D. &

Q43. Which data structure is most suitable for representing hierarchical data such as a file system?
A. Queue
B. Tree
C. Stack
D. Array

Q44. Which sorting algorithm recursively divides an array into smaller parts and sorts them before combining the results?
A. Bubble Sort
B. Selection Sort
C. Quick Sort
D. Insertion Sort

Q45. Which statement correctly describes the relationship between a primary key and candidate keys?
A. Every candidate key is a primary key.
B. A primary key is one of the candidate keys chosen to identify records uniquely.
C. A candidate key is created from a foreign key.
D. A primary key may contain duplicate values.

Q46. Which SQL clause cannot directly contain an aggregate function such as `COUNT()` or `SUM()`?
A. HAVING
B. WHERE
C. SELECT
D. ORDER BY

Q47. A process has requested an I/O operation and cannot continue execution until the operation completes. Which process state is it most likely in?
A. Running
B. Ready
C. Waiting (Blocked)
D. Terminated

Q48. Which Linux command can both create an empty file and update the timestamp of an existing file?
A. cp
B. touch
C. chmod
D. pwd

Q49. Which protocol allows an email client to access and synchronize messages stored on a mail server without downloading them permanently?
A. POP3
B. SMTP
C. IMAP
D. FTP

Q50. Which type of malicious software is designed to replicate itself and spread automatically across computer networks without user intervention?
A. Trojan Horse
B. Worm
C. Spyware
D. Adware

Q51. Which C++ feature allows a base class pointer to invoke the overridden function of a derived class at runtime?
A. Virtual Function
B. Friend Function
C. Inline Function
D. Static Function

Q52. Which OOP concept allows different classes to provide their own implementation of the same function?
A. Inheritance
B. Encapsulation
C. Polymorphism
D. Aggregation

Q53. Which data structure is commonly used to represent the hierarchical structure of folders and subfolders in a file system?
A. Queue
B. Tree
C. Stack
D. Graph

Q54. Which algorithm has the best average-case time complexity among these for sorting large datasets?
A. Bubble Sort
B. Selection Sort
C. Insertion Sort
D. Merge Sort

Q55. A relation is in Boyce–Codd Normal Form (BCNF) if:
A. Every non-key attribute is fully functionally dependent on the primary key.
B. Every determinant is a candidate key.
C. There are no transitive dependencies.
D. Every table has only one candidate key.

Q56. If a table contains 100 rows and 20 values in the `Salary` column are `NULL`, what is the result of `COUNT(Salary)`?
A. 100
B. 20
C. 80
D. NULL

Q57. During program execution, which memory area is primarily used to store local variables and function call information?
A. Heap
B. Cache
C. Stack
D. Register

Q58. A user wants to move a file from one directory to another while keeping the original filename unchanged. Which Linux command should be used?
A. cp
B. mv
C. ls
D. cat

Q59. Which IPv4 address class provides the largest number of host addresses per network?
A. Class A
B. Class B
C. Class C
D. Class D

Q60. Which type of malware secretly records keystrokes to steal passwords and sensitive information?
A. Worm
B. Trojan
C. Keylogger
D. Ransomware

Q61. Which C++ keyword allows a function to be called without creating an object of the class?
A. const
B. static
C. virtual
D. friend

Q62. Which statement is true for both min-heaps and max-heaps?
A. They store elements in sorted order.
B. They are complete binary trees.
C. Their inorder traversal is always sorted.
D. They always satisfy the Binary Search Tree property.

Q63. Which data structure is most appropriate for implementing expression evaluation in a compiler?
A. Queue
B. Graph
C. Stack
D. Array

Q64. Which type of SQL join returns only the rows that have matching values in both tables?
A. LEFT JOIN
B. INNER JOIN
C. RIGHT JOIN
D. FULL OUTER JOIN

Q65. Which SQL command permanently removes all records from a table while keeping the table structure?
A. DROP
B. DELETE
C. TRUNCATE
D. REMOVE

Q66. Which CPU scheduling algorithm always selects the process with the smallest execution time?
A. FCFS
B. Priority
C. Round Robin
D. Shortest Job First

Q67. Which Linux command is used to change the access permissions of a file or directory?
A. chmod
B. chown
C. cp
D. grep

Q68. Which protocol is generally preferred for real-time applications such as live video streaming because it minimizes transmission delay?
A. TCP
B. UDP
C. HTTP
D. SMTP

Q69. Which networking device does not maintain a forwarding table or make forwarding decisions based on addresses?
A. Router
B. Switch
C. Bridge
D. Repeater

Q70. Which type of malware encrypts a user's files and demands payment to restore access?
A. Worm
B. Trojan Horse
C. Ransomware
D. Spyware

Q71. Which C++ keyword suggests to the compiler that a function may be expanded at its point of call to reduce function call overhead?
A. static
B. const
C. virtual
D. inline

Q72. Which statement is always true for a complete binary tree?
A. Every node has exactly two children.
B. All levels are completely filled.
C. All levels except possibly the last are completely filled, and the last level is filled from left to right.
D. Every internal node has exactly one child.

Q73. Which data structure is commonly used to implement Breadth-First Search (BFS) in a graph?
A. Stack
B. Queue
C. Array
D. Linked List

Q74. What is the primary purpose of creating an index on a database table?
A. Reduce the table size
B. Improve query performance
C. Enforce referential integrity
D. Prevent duplicate records

Q75. Which normal form eliminates transitive dependency from a relation?
A. 1NF
B. 2NF
C. 3NF
D. BCNF

Q76. Which memory management scheme divides both logical and physical memory into fixed-size blocks?
A. Segmentation
B. Paging
C. Swapping
D. Partitioning

Q77. In a paging system, what information is typically stored in a page table?
A. The process priority and execution time
B. The list of free disk blocks
C. The mapping between virtual page numbers and physical frame numbers
D. The CPU register values of a process

Q78. Which networking device connects multiple computers within the same Local Area Network (LAN) and forwards frames using MAC addresses?
A. Router
B. Switch
C. Modem
D. Gateway

Q79. Which protocol is commonly used to transfer files between computers over a TCP/IP network?
A. FTP
B. SMTP
C. DNS
D. ARP

Q80. An application fails to properly validate user-supplied input before using it in database queries. Which attack is most likely to occur?
A. Phishing
B. SQL Injection
C. Denial-of-Service (DoS)
D. Spoofing

Q81. Which C++ feature allows a non-member function or another class to access the private and protected members of a class when explicitly authorized?
A. Friend Function
B. Virtual Function
C. Inline Function
D. Static Function

Q82. Which data structure is used by a compiler to check whether parentheses in an expression are balanced?
A. Queue
B. Stack
C. Heap
D. Graph

Q83. During a context switch, the operating system saves the execution context of the currently running process primarily in the:
A. Cache Memory
B. Process Control Block (PCB)
C. Page Table
D. Translation Lookaside Buffer (TLB)

Q84. Which combination correctly identifies resources that are private to each thread in a multithreaded process?
A. Heap and Global Variables
B. Address Space and Open Files
C. Program Counter, Registers, and Stack
D. Code Segment and Shared Libraries

Q85. Two users simultaneously update the same database record. Which ACID property ensures that the final result is equivalent to executing the transactions one after another?
A. Consistency
B. Atomicity
C. Isolation
D. Durability.

Q86. Which page replacement algorithm replaces the page that has not been used for the longest time?
A. FIFO
B. LRU
C. Optimal
D. LFU

Q87. A user attempts to delete a directory using a command that succeeds only when the directory is empty. Which command is being used?
A. rm
B. cp
C. rmdir
D. touch

Q88. Which protocol is responsible for assigning IP addresses automatically to hosts on a network?
A. DNS
B. DHCP
C. HTTP
D. ICMP

Q89. Which network topology connects every device directly to every other device?
A. Star
B. Bus
C. Ring
D. Mesh

Q90. An attacker disguises an email so that it appears to originate from a legitimate organization. This technique is primarily known as:
A. Spoofing
B. SQL Injection
C. Session Hijacking
D. Worm Propagation

Q91. Which C++ feature makes a class abstract, preventing objects of that class from being instantiated?
A. Constructor Overloading
B. Pure Virtual Function
C. Friend Function
D. Inline Function

Q92. A sorting algorithm preserves the relative order of records having equal keys. This property is known as:
A. Stability
B. Adaptiveness
C. Completeness
D. Balance

Q93. For a graph with a large number of vertices but relatively few edges, the most space-efficient representation is:
A. Adjacency Matrix
B. Adjacency List
C. Incidence Matrix
D. Edge Table

Q94. All changes made during the current transaction are permanently saved using the:
A. COMMIT command
B. ROLLBACK command
C. SAVEPOINT command
D. GRANT command

Q95. Referential integrity in a relational database is enforced using the:
A. Primary Key
B. Foreign Key
C. Candidate Key
D. Super Key

Q96. The operating system performs a context switch under which of the following conditions?
A. A running process blocks for I/O or its allocated CPU time expires.
B. A process executes an arithmetic instruction.
C. A file is opened successfully.
D. A variable is declared inside a function.

Q97. A user wants to display only the lines in a text file that contain a specific pattern. The appropriate Linux command is:
A. cat
B. grep
C. touch
D. pwd

Q98. Remote login with encrypted communication is provided by the:
A. Telnet
B. SSH
C. FTP
D. TFTP

Q99. The address 127.0.0.1 is commonly used to:
A. Identify the default gateway
B. Broadcast packets to all hosts
C. Test the local network interface (loopback)
D. Identify the DNS server

Q100. The dollar sign ($) in an Excel cell reference is used to:
A. Format the cell as currency
B. Lock the row, column, or both during formula copying
C. Indicate a text value
D. Hide the cell from editing

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