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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S6 (R,S) Examinations April 2026 (2019 Scheme)

Course Code: CCT308
Course name: COMPREHENSIVE COURSE WORK

Max. Marks: 50 Duration: 1Hour

Instructions: ***(1) Each question carries one mark. No negative marks for wrong answers***
(2) Total number of questions: 50
(3) All questions are to be answered. Each question will be followed by 4 possible answers of which only ONE is correct.
(4) If more than one option is chosen, it will not be considered for valuation.

1. How many distinct binary search trees can be created out of 4 distinct keys?
   a) 8 b) 24 c) 14 d) None of the above
2. In a complete 4-ary tree, every internal node has exactly 4 children or no child. The number of leaves in such a tree with 6 internal nodes is:
   a) 20 b) 18 c) 19 d) 17
3. What does 'stack overflow' refer to?
   a) accessing item from an undefined stack b) adding items to a full stack c) removing items from an empty stack d) index out of bounds exception
4. Which data structure provides First-In-First-Out (FIFO) access to elements?
   a) Stack b) Queue c) Hash table d) Binary tree
5. Which operation on a stack removes and returns the top element?
   a) Pop b) Peek c) Push d) Enqueue
6. The time complexity of heap sort in worst case is:
   a) O(logn) b) O(n) c) O(nlogn) d) O(n2)
7. Which traversal order visits the root of a binary tree between its left and right subtrees?
   a) Inorder b) Preorder c) Postorder d) Level-order
8. A connected graph T without any cycles is called ……..
   a) tree b) Cyclic graph c) non-cyclic graph d) circular graph
9. What is the maximum number of children a node can have in a Binary Tree?
   a) 1 b) 2 c) 3 d) Unlimited
10. Find the output of the following prefix expression.
    *+2-2 1/-4 2+-5 3 1

a) 2 b) 12 c) 10 d) 4

11 Which of the following is the core part of the Operating System that manages system resources and facilitates communication between hardware and software?

a) Shell b) Compiler c) Kernel d) System Utility

12 The circular wait condition can be prevented by

a) using thread b) defining a linear ordering of resource types c) using pipes d) all of the above

13 The process of saving the state of the current CPU context (registers, program counter, etc.) and loading the state for another process is known as:

a) Threading b) Context Switching c) Inter-Process Communication (IPC) d) Swapping

14 The technique used by the Operating System to allow a process to use a greater memory space than is physically available in RAM is known as:

a) Paging b) Fragmentation c) Virtual Memory d) Compaction

15 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) dynamic condition b) race condition c) essential condition d) critical condition

16 The processes that are residing in main memory and are ready and waiting to execute are kept on a list called _____

a) job queue b) ready queue c) execution queue d) process queue

17 Which one of the following is a synchronization tool?

a) Semaphore b) Pipe c) Thread d) Socket

18 What is the full form of RMI?

a) Remote Memory Installation b) Remote Memory Invocation c) Remote Method Installation d) Remote Method Invocation

19 Dirty bit is used to indicate which of the following?

a) A page fault has occurred b) A page has corrupted data c) A page has been modified after being loaded into cache d) An illegal access of page

20 Which of the following CPU scheduling algorithms is non-preemptive?

a) Round Robin b) Shortest Remaining Time First (SRTF) c) Priority Scheduling (with preemption) d) First-Come, First-Served (FCFS)

21 IPSec operates at two different modes: _____ mode and _____ mode.

a) Transport mode and Tunnel mode b) Secure mode and Non-secure mode c) Authentication mode and Encryption mode d) Public mode and Private mode

22 Spoofing in network security refers to

a) Hiding data from attackers
b) Pretending to be another user/system
c) Encrypting data packets
d) Preventing brute force attacks

23 Which device is used to connect different networks together?

a) Switch
b) Repeater
c) Router
d) Hub

24 Which network topology requires a central controller or hub for all nodes to connect, where a failure of the central device can bring down the entire network?

a) Star Topology
b) Bus Topology
c) Mesh Topology
d) Ring Topology

25 The length of an IPv6 address is:

a) 32 bits
b) 64 bits
c) 128 bits
d) 256 bits

26 In the OSI model, which layer is responsible for organizing bits into logical units called frames?

a) Application Layer
b) Data Link Layer
c) Network Layer
d) Transport Layer

27 _____monitors and controls incoming and outgoing network traffic based on predetermined security rules.

a) spyware
b) cookie
c) spam
d) firewall

28 Which of the following best describes the purpose of ARP in IPv4 networks?

a) To dynamically assign IP addresses to hosts
b) To discover routers on a link and exchange routes
c) To resolve an IP address to a MAC address on the local network
d) To find the default gateway's IP address via multicast

29 What does VPN stand for?

a) Virtual Private Network
b) Verified Private Network
c) Virtual Public Node
d) Variable Process Node

30 Which device primarily connects multiple devices within the same local network segment and forwards frames based on MAC addresses?

a) Modem
b) Switch
c) Router
d) Firewall

31 Which command is used to remove a relation from an SQL?

a) Drop table
b) Delete
c) Purge
d) Remove

32 In RDBMS, different classes of relations are created using _____ technique to prevent modification anomalies.

a) Functional Dependencies
b) Data integrity
c) Referential integrity
d) Normal Forms

33 In functional dependency Armstrong inference rules refers to

a) Reflexivity, Augmentation and Decomposition
b) Transitivity, Augmentation and Reflexivity
c) Augmentation, Transitivity, Reflexivity and Decomposition
d) Reflexivity, Transitivity and Decomposition

34 In SQL, the SELECT clause corresponds to which operation in relational algebra?

a) Projection b) Cartesian product c) Selection predicate d) Join

35 Relations produced from E R Model will always be in

a) 1 NF b) 2 NF c) 3 NF d) 4 NF

36 Which key is used to uniquely identify a record (or tuple) in a table?

a) Foreign Key b) Primary Key c) Candidate Key d) Super Key

37 Which SQL command is used to retrieve data from a database?

a) INSERT b) UPDATE c) DELETE d) SELECT

38 Which clause is used to filter the groups resulting from the GROUP BY clause?

a) WHERE b) FILTER BY c) ORDER BY d) HAVING

39 A dependency where a non-key attribute is dependent on a part of the composite primary key is called a:

a) Transitive Dependency b) Multivalued Dependency c) Partial Dependency d) Trivial Dependency

40 Which Type of Join Returns every Row from both Tables, Joining them where Conditions are met and Filling in NULLs for Missing Matches?

a) INNER JOIN b) LEFT JOIN c) RIGHT JOIN d) FULL OUTER JOIN

41 Which principle of cryptography ensures that data has not been altered or corrupted?

a) Confidentiality b) Non-repudiation c) Integrity d) Availability

42 In Asymmetric (Public-Key) cryptography, which key is kept secret by the owner?

a) The Public Key b) The Session Key c) The Private Key d) The Shared Secret Key

43 To create a Digital Signature for a message M, the sender typically encrypts the hash of M using which key?

a) The receiver's public key b) The receiver's private key c) The sender's private key d) A shared symmetric key

44 An attack where an adversary intercepts and potentially modifies messages between two parties who believe they are communicating directly is known as a:

a) Brute Force Attack b) Side-Channel Attack c) Denial of Service (DoS) Attack d) Man-in-the-Middle (MITM) Attack

45 Which of the following attacks specifically targets the weaknesses in a cryptographic algorithm?

a) Phishing b) Man-in-the middle c) Cryptanalysis d) Denial of Service

46 Which of the following is not a key length for AES?

a) 128-bit b) 256-bit c) 512-bit d) 192

47 In an RSA cryptosystem, a particular A uses two prime numbers p = 13 and q =17 to generate her public and private keys. If the public key of A is 35. Then the private key of A is?

a) 114 b) 42 c) 46 d) 93

48 Which of the following principle of cryptography explains transmitted data in air must be read by

the authentic user?

a) Privacy b) Reliability c) Non-repudiation d) Authentication

49 The DES Algorithm Cipher System consists of _____rounds (iterations) each with a round key

a) 12 b) 18 c) 19 d) 16

50 What is the primary characteristic of symmetric encryption?

a) It uses the same key for encryption and decryption.

b) It uses different keys for encryption and decryption.

c) It is only used for digital signatures.

d) It requires a third-party certificate authority.

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