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Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S6 (S,FE) Examination December 2025 (2019 Scheme)

Course Code: CDT308

Course name: COMPREHENSIVE COURSE WORK

Max. Marks: 50

Duration: 1 Hour

- 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.

- Which data structure follows the Last-In, First-Out (LIFO) principle?
 - Queue
 - Stack
 - Linked List
 - Graph
- Which sorting algorithm has an average time complexity of $O(n \log n)$?
 - Bubble Sort
 - Insertion Sort
 - Merge Sort
 - Selection Sort
- Which of the following is true about linked list implementation of stack?
 - In push operation, if new nodes are inserted at the beginning of linked list, then in pop operation, nodes must be removed from end.
 - In push operation, if new nodes are inserted at the end, then in pop operation, nodes must be removed from the beginning.
 - Both of these
 - None of these
- The minimum number of stacks needed to implement a queue is
 - 3
 - 1
 - 2
 - 4
- What is the best case for linear search?
 - $O(n \log n)$
 - $O(\log n)$
 - $O(\log n)$
 - $O(1)$
- What is the primary difference between a directed graph and an undirected graph?
 - A directed graph has nodes with unique identifiers, while an undirected graph does not.
 - A directed graph has edges with direction, while an undirected graph does not.
 - There is no difference between them.
 - A directed graph has nodes with unique identifiers, while an undirected graph does not.

not.

7. What is a spanning tree of a graph?
- a) A subgraph that includes only leaf nodes.
 - b) A subset of edges that forms a cycle.
 - c) A tree where all nodes are leaves.
 - d) A subgraph that includes all vertices and is connected without any cycles.
8. Which of the following is NOT a common operation on an array?
- a) Insertion at a specific index
 - b) Deletion at a specific index
 - c) Resizing the array in constant time
 - d) Accessing an element by its index
9. What is the term for the condition when a stack is completely full and no more elements can be pushed?
- a) Underflow
 - b) Overflow
 - c) Empty stack
 - d) Full queue
10. What is the depth of a node in a tree?
- a) The number of children it has.
 - b) The number of edges from the root to that node.
 - c) The height of the subtree rooted at that node.
 - d) The total number of its descendants.
11. What is a real-time operating system (RTOS)?
- a) An OS designed for gaming
 - b) An OS designed for servers
 - c) An OS designed for applications with strict time constraints
 - d) An OS with a graphical user interface
12. What is mutual exclusion?
- a) Ensuring that multiple processes can access a shared resource simultaneously
 - b) Ensuring that only one process can access a shared resource at a time
 - c) Preventing deadlocks
 - d) Allowing processes to communicate with each other
13. A page fault occurs when
- a) the Deadlock happens
 - b) the Segmentation starts
 - c) the page is found in the memory
 - d) the page is not found in the memory
14. What is the purpose of a system call?
- a) To directly access hardware
 - b) To request services from the operating system kernel
 - c) To execute user programs
 - d) To handle interrupts
15. What is the role of the shell in an operating system?

- a) To manage the kernel b) To provide a user interface for accessing OS services c) To handle hardware interrupts d) To perform memory allocation
- 16 (i) Mutual exclusion a) A process may hold allocated resources while waiting assignment.
 ii) Hold and wait b) No resource can be forcibly removed from a process holding it.
 iii) No pre-emption c) Only one process may use a resource at a time.
- a) i-a, ii-b, iii-c b) i-a, ii-c, iii-b c) i-b, ii-c, iii-a d) i-c, ii-a, iii-b
- 17 A direct method of deadlock prevention is to prevent the occurrences of
- a) Mutual exclusion b) Hold and wait c) Circular waits d) No preemption
- 18 17.-----policy selects the disk I/O request that requires the least movement of the disk arm from its current position
- a) FSCAN b) SSTF c) SCAN d) C-SCAN
- 19 _____ refers to the ability of multiple process (or threads) to share code, resources or data in such a way that only one process has access to shared object at a time.
- a) Synchronization b) Mutual Exclusion c) Dead lock d) Starvation
- 20 Process Management function of an operating system kernel includes
- a) Process creation and termination b) Process scheduling and dispatching c) Process switching d) All of these
- 21 Which bus carries the memory addresses from the CPU to the memory?
- a) Data Bus b) Control Bus c) Address Bus d) System Bus
- 22 The fetch-decode-execute cycle is a fundamental concept related to the:
- a) Operating System b) CPU operation c) Memory management d) I/O operations
- 23 Which component of the CPU interprets instructions?
- a) ALU b) Registers c) Control Unit d) Cache
- 24 In CISC architecture most of the complex instructions are stored in _____
- a) CMOS b) Register c) Transistors d) Diodes
- 25 In which of the following term the performance of cache memory is measured?
- a) Chat ratio b) Hit ratio c) Copy ratio d) Data ratio
- 26 Step of computer which performs the action given in the instruction is called
- a) fetch b) calculate c) decode d) Execute
- 27 The memory unit of a computer has 1 Giga words of 64 bits each. The computer has instruction

format, with 4 fields: an opcode field; a mode field to specify one of 12 addressing modes; a register address field to specify one of 48 registers; and a memory address field. If an instruction is 64 bits long, how large is the opcode field?

- a) 34 bits b) 24 bits c) 20 bits d) 14 bits
- 28 A SIMD (Single Instruction, Multiple Data) architecture is best suited for:
- a) Executing different instructions on different data b) Executing the same instruction on multiple data elements simultaneously c) Serial processing of data d) Executing multiple instructions on a single data element
- 29 The maximum addressing capacity of a microprocessor which uses a 16-bit database & 32-bit address base is:
- a) 64 K b) 4 GB c) Both (a) & (b) d) None of these
- 30 The average time required to reach a storage location in memory and obtain its contents is called:
- a) Seek time b) Turnaround time c) Access time d) Transfer time
- 31 Which of the following is NOT a type of database model?
- a) Relational model b) Network model c) Hierarchical model d) Procedural model
- 32 The set of all possible values that an attribute can take is called its:
- a) Degree b) Cardinality c) Domain d) Relation
- 33 What is referential integrity?
- a) Ensuring that all data in a table is accurate b) Ensuring that the relationships between tables are consistent c) Ensuring that the primary key values are unique d) Ensuring that all foreign key values have a corresponding primary key value in the referenced table
- 34 Which relational algebra operation combines tuples from two relations based on a common attribute?
- a) Select b) Project c) Union d) Join
- 35 What is an equi-join?
- a) A join operation where the join condition involves equality (=) b) A join operation where all attributes are included in the result c) A join operation with no join condition d) A join operation that always results in an empty set
- 36 Consider a relation R with attributes A, B, C, D and E and functional dependencies $A \rightarrow BC$, $BC \rightarrow E$, $E \rightarrow DA$. What is the highest normal form that the relation satisfies?
- a) BCNF b) 3NF c) 2 NF d) 1 NF

- 37 The given Query can also be replaced with _____: SELECT name, course_id FROM instructor, teaches WHERE instructor_ID= teaches_ID
- a) Select name, course_id from teaches, instructor where instructor_id=course_id;
- b) Select name, course_id from instructor natural join teaches;
- c) Select name, course_id from instructor
- d) Select course_id from instructor join teaches
- 38 For the given schedule S, find out the conflict equivalent schedule.
S : r1(x); r2(Z) ; r3(X); r1(Z); r2(Y); r3(Y); W1(X); W2(Z); W3(Y); W2(Y)
- a) $T1 \rightarrow T2 \rightarrow T3$
- b) $T2 \rightarrow T1 \rightarrow T3$
- c) $T3 \rightarrow T1 \rightarrow T2$
- d) Not conflict serializable
- 39 A _____ is a special kind of a store procedure that executes in response to certain action on the table like insertion, deletion or updation of data
- a) Procedures
- b) Triggers
- c) Functions
- d) None of the mentioned
- 40 What is two-phase locking (2PL)?
- a) A locking protocol with two types of locks: read and write.
- b) A locking protocol where each transaction goes through a growing phase (acquiring locks) and a shrinking phase (releasing locks).
- c) A locking protocol that ensures serializability by acquiring all locks at the beginning.
- d) A locking protocol that releases all locks at the end of the transaction.
- 41 What type of analytics answers the question "What will happen?"
- a) Predictive Analytics
- b) Prescriptive Analytics
- c) Descriptive Analytics
- d) Diagnostic Analytics
- 42 Which of the following is an example of semi-structured data?
- a) Numerical data in a table
- b) Plain text files
- c) JSON files
- d) Images
- 43 Which of the following is used to measure the accuracy of a model in data analytics?
- a) Mean squared error
- b) Descriptive statistics
- c) Histograms
- d) Outlier detection
- 44 Which of the following is an example of a data analytics tool?
- a) Excel
- b) Python
- c) R
- d) All of these
- 45 _____ refers to the ability to turn your data useful for business.
- a) Variety
- b) Value
- c) Velocity
- d) None of these
- 46 A good data analytics solution includes a viable self-service _____.
- a) Data mining
- b) Data warehouse
- c) Data wrangling
- d) None of these

