CS SET 2

Q1. Which of the following best explains why cache memory improves CPU performance?
A) It stores all main memory data permanently
B) It operates slower than main memory but larger
C) It reduces the average time to access data from main memory
D) It acts as secondary storage for CPU
Answer: C) It reduces the average time to access data from main memory
Explanation: Cache memory is faster and closer to the CPU, reducing latency by storing frequently accessed instructions/data.

Q2. The logic expression $(A + B)(A + B')$simplifies to:
A) A
B) B
C) AB
D) A + B
Answer: A) A
Explanation: By applying the distributive law: (A + B)(A + B') = A + BB' = A + 0 = A.

Q3. In C language, what happens if you use free() on a pointer that was not dynamically allocated?
A) It compiles but may cause runtime error
B) It safely does nothing
C) It automatically allocates memory
D) It initializes the pointer to NULL
Answer: A) It compiles but may cause runtime error
Explanation: Calling free() on non-dynamic memory causes undefined behavior and potential crash.

Q4. Which data structure is used by compilers to implement function call and return mechanisms?
A) Queue
B) Stack

C) Tree
D) Linked list
Answer: B) Stack
Explanation: Function calls use a call stack to store activation records, return addresses, and local variables.

Q5. The time complexity of building a Binary Search Tree from an unsorted array is:
A) O(n)
B) O(n log n)
C) $O(n^2)$
D) O(log n)
Answer: C) $O(n^2)$
Explanation: In the worst case (sorted input), every insertion takes O(n), resulting in $O(n^2)$ overall.

Q6. A transaction that reads and writes data but fails before committing causes which problem?
A) Dirty read
B) Uncommitted dependency
C) Inconsistent retrieval
D) Lost update
Answer: C) Inconsistent retrieval
Explanation: If a transaction fails mid-way, data read or written may not match the database's consistent state.

Q7. Which scheduling algorithm may cause *starvation* of long processes?
A) Round Robin
B) FCFS
C) Priority Scheduling
D) SJF (Shortest Job First)
Answer: D) SJF (Shortest Job First)
Explanation: SJF favors short jobs; longer processes may never execute if new shorter jobs keep arriving.

Q8. Which of the following best describes subnetting?
A) Combining two networks into one
B) Dividing a network into smaller logical networks
C) Encrypting network traffic
D) Assigning public IP addresses
Answer: B) Dividing a network into smaller logical networks
Explanation: Subnetting optimizes IP address usage and improves routing efficiency by segmenting networks.

Q9. Which software testing technique uses boundary values to detect errors?
A) Black box testing
B) White box testing
C) Regression testing
D) Mutation testing
Answer: A) Black box testing
Explanation: Boundary value analysis (a black-box method) checks edge conditions for input ranges.

Q10. The main goal of symmetric key cryptography is:
A) Using public and private keys
B) Using one key for encryption and decryption
C) Providing message authentication only
D) Generating digital signatures
Answer: B) Using one key for encryption and decryption
Explanation: Symmetric encryption uses the same secret key for both encryption and decryption.

Q11. In HTML5, which element is used to draw graphics dynamically using JavaScript?
A) <svg>
B) <canvas>
C) <embed>
D) <object>

Answer: B) <canvas>
Explanation: The <canvas> element allows rendering of 2D graphics via JavaScript.

Q12. The binary equivalent of hexadecimal number "3F2" is:
A) 1111110010
B) 1101110010
C) 1010110010
D) 1110110110
Answer: A) 1111110010
Explanation: 3 → 0011, F → 1111, 2 → 0010 → Combined: 001111110010 → 1111110010.

Q13. Which component in an op-amp circuit determines its gain in an inverting amplifier configuration?
A) Input capacitor
B) Feedback resistor
C) Output diode
D) Power supply voltage
Answer: B) Feedback resistor
Explanation: The gain of an inverting op-amp = –(Rf / Rin), where Rf is the feedback resistor.

Q14. In C++, what will happen if a base class destructor is not declared virtual?
A) No effect
B) Derived destructor won't be called through base pointer
C) Compilation error
D) Memory leak prevention
Answer: B) Derived destructor won't be called through base pointer
Explanation: Without a virtual destructor, deleting a derived object through base pointer causes incomplete cleanup.

Q15. Which tree traversal method is best suited for copying a tree structure?
A) Preorder

B) Inorder
C) Postorder
D) Level order
Answer: A) Preorder
Explanation: Preorder visits root first, allowing construction of new nodes before processing subtrees.

Q16. Which algorithm design paradigm is used in Kruskal's algorithm?
A) Divide and Conquer
B) Greedy
C) Dynamic Programming
D) Backtracking
Answer: B) Greedy
Explanation: Kruskal's algorithm greedily selects the smallest edge to form a Minimum Spanning Tree.

Q17. Which anomaly occurs when two transactions read and write the same data item concurrently?
A) Lost update
B) Unrepeatable read
C) Phantom read
D) Deadlock
Answer: A) Lost update
Explanation: Lost updates occur when one transaction overwrites another's uncommitted changes.

Q18. The OS component responsible for translating virtual addresses to physical addresses is:
A) Scheduler
B) Memory Manager
C) MMU (Memory Management Unit)
D) Kernel Driver
Answer: C) MMU (Memory Management Unit)
Explanation: The MMU maps virtual memory addresses to actual physical memory locations.

Q19. What is the purpose of the ARP protocol in networking?
A) To resolve domain names
B) To translate IP addresses to MAC addresses
C) To encrypt data packets
D) To establish TCP connections
Answer: B) To translate IP addresses to MAC addresses
Explanation: ARP (Address Resolution Protocol) maps IP addresses to corresponding MAC addresses in a LAN.

Q20. Which software development model combines iterative development with risk analysis?
A) Waterfall
B) Agile
C) Spiral
D) Prototype
Answer: C) Spiral
Explanation: Spiral model iteratively refines the system while analyzing risks at each phase.

Q21. The process of ensuring that data has not been altered in transmission is called:
A) Confidentiality
B) Integrity
C) Authentication
D) Availability
Answer: B) Integrity
Explanation: Integrity ensures data remains accurate and unmodified during transfer or storage.

Q22. In CSS, what is the specificity order from lowest to highest?
A) Inline → ID → Class → Element
B) Element → Class → ID → Inline
C) ID → Class → Element → Inline

D) Class → Element → Inline → ID
Answer: B) Element → Class → ID → Inline
Explanation: Inline styles have the highest priority, followed by IDs, classes, and elements.

Q23. The Boolean function $AB + A'B$ simplifies to:
A) A
B) B
C) A + B
D) AB
Answer: B) B
Explanation: $AB + A'B = B(A + A') = B(1) = B$.

Q24. A Zener diode in a circuit is used for:
A) Amplification
B) Voltage regulation
C) Rectification
D) Switching
Answer: B) Voltage regulation
Explanation: Zener diodes maintain a constant output voltage when reverse-biased beyond breakdown voltage.

Q25. In Java, what is the difference between == and .equals() for object comparison?
A) Both compare content
B) == compares references, .equals() compares content
C) == compares content, .equals() compares references
D) Both perform deep comparison
Answer: B) == compares references, .equals() compares content
Explanation: == checks memory address equality; .equals() checks logical (value) equality when overridden.

Q26. In computer architecture, “pipelining” improves:
A) CPU clock speed

B) Instruction throughput
C) Instruction latency
D) Memory bandwidth
Answer: B) Instruction throughput
Explanation: Pipelining increases the number of instructions completed per unit time (throughput), though latency per instruction may remain unchanged.

Q27. The minimal SOP form of Boolean expression $A'BC + AB'C + ABC'$ is:
A) A + B + C
B) AB + BC + AC
C) A $\oplus$ B $\oplus$ C
D) (A + B)(B + C)(C + A)
Answer: C) A $\oplus$ B $\oplus$ C
Explanation: This expression is the XOR of three variables, which outputs 1 for an odd number of 1s.

Q28. Which of the following correctly represents Ohm's Law?
A) $I = R/V$
B) $V = IR$
C) $P = I/R$
D) $R = VI$
Answer: B) $V = IR$
Explanation: Ohm's Law defines voltage as the product of current and resistance.

Q29. In C language, what is the size of the expression sizeof('A') on a 32-bit system?
A) 1 byte
B) 2 bytes
C) 4 bytes
D) Depends on compiler
Answer: C) 4 bytes
Explanation: Character literals like 'A' are of type int, not char, so typically 4 bytes on 32-bit systems.

Q30. Which of the following data structures cannot be implemented using linked lists?
A) Queue
B) Stack
C) Hash table
D) Array
Answer: D) Array
Explanation: Arrays have contiguous memory allocation, unlike linked structures.

Q31. What is the average time complexity of searching in a balanced binary search tree?
A) O(1)
B) O(log n)
C) O(n)
D) O(n log n)
Answer: B) O(log n)
Explanation: Balanced BSTs (like AVL or Red-Black Trees) maintain logarithmic height.

Q32. Which normal form removes transitive dependency in a relational database?
A) 1NF
B) 2NF
C) 3NF
D) BCNF
Answer: C) 3NF
Explanation: 3NF eliminates transitive dependencies (non-prime → non-prime via another attribute).

Q33. Which of the following memory types is *volatile*?
A) ROM
B) EEPROM

C) Flash
D) SRAM
Answer: D) SRAM
Explanation: Static RAM retains data only while powered, making it volatile.

Q34. The banker's algorithm in OS is used for:
A) Page replacement
B) Deadlock detection
C) Deadlock avoidance
D) Mutual exclusion
Answer: C) Deadlock avoidance
Explanation: Banker's algorithm ensures system never enters an unsafe state by simulating allocations.

Q35. The maximum number of hosts supported in a /26 subnet is:
A) 32
B) 62
C) 64
D) 126
Answer: B) 62
Explanation: /26 means 6 host bits → $2^6 - 2 = 62$ usable addresses.

Q36. Which software development model ensures working software is delivered frequently in iterations?
A) Waterfall
B) Agile
C) Spiral
D) V-model
Answer: B) Agile
Explanation: Agile emphasizes iterative, incremental delivery and customer feedback.

Q37. The type of attack where data is captured and resent later to deceive the receiver is:

A) Spoofing
B) Replay attack
C) Phishing
D) Sniffing
Answer: B) Replay attack
Explanation: Replay attacks resend valid data packets to gain unauthorized access.

Q38. Which of the following HTML elements is semantic?
A)
B)
C) <article>
D) <font>
Answer: C) <article>
Explanation: <article> conveys meaning about content structure, unlike purely stylistic tags.

Q39. The propagation delay of a logic gate is mainly due to:
A) Input capacitance and transistor switching time
B) Power supply voltage
C) Gate oxide thickness
D) Output resistance only
Answer: A) Input capacitance and transistor switching time
Explanation: Delay results from charging/discharging internal capacitances through transistor resistances.

Q40. Which keyword in Java is used to prevent method overriding?
A) abstract
B) static
C) final
D) volatile
Answer: C) final
Explanation: A final method cannot be overridden in a derived class.

Q41. Which data structure efficiently supports both LRU cache implementation and fast lookup?
A) Stack
B) HashMap + Doubly Linked List
C) Queue
D) Binary Search Tree
Answer: B) HashMap + Doubly Linked List
Explanation: HashMap provides O(1) access; linked list maintains order of usage.

Q42. The master theorem helps in analyzing:
A) Dynamic programming algorithms
B) Recurrence relations
C) Graph traversals
D) Backtracking problems
Answer: B) Recurrence relations
Explanation: Master theorem provides asymptotic bounds for divide-and-conquer recurrences.

Q43. In DBMS, ACID property "Isolation" ensures:
A) Transactions execute serially
B) Transactions' intermediate results are invisible to others
C) Transactions are atomic
D) Database recovers automatically
Answer: B) Transactions' intermediate results are invisible to others
Explanation: Isolation prevents concurrent transactions from interfering.

Q44. Page replacement algorithm with the lowest page-fault rate is:
A) FIFO
B) LRU
C) Optimal
D) Clock
Answer: C) Optimal
Explanation: Optimal replaces the page that won't be used for the longest future period (theoretical benchmark).

Q45. In computer networks, TCP provides:
A) Unreliable, connectionless service
B) Reliable, connection-oriented service
C) Connectionless multicast service
D) Error-free delivery without sequencing
Answer: B) Reliable, connection-oriented service
Explanation: TCP guarantees ordered, reliable delivery using acknowledgment and retransmission.

Q46. The main purpose of software validation is to ensure:
A) The program runs faster
B) The software meets user requirements
C) Code follows coding standards
D) All modules are compiled successfully
Answer: B) The software meets user requirements
Explanation: Validation checks “Are we building the right product?” as opposed to verification.

Q47. The process of disguising data to protect its confidentiality is called:
A) Encoding
B) Hashing
C) Encryption
D) Compression
Answer: C) Encryption
Explanation: Encryption transforms readable data into ciphertext using algorithms and keys.

Q48. In CSS, the z-index property works only for elements with:
A) position: relative;
B) position: absolute; or fixed;
C) display: flex;
D) visibility: hidden;
Answer: B) position: absolute; or fixed;

Explanation: z-index controls stacking order, effective only for positioned elements.

Q49. The output of NAND gate followed by NOT gate is equivalent to:
A) AND gate
B) OR gate
C) NOR gate
D) XOR gate
Answer: A) AND gate
Explanation: NOT(NAND(A,B)) = AND(A,B).

Q50. A differential amplifier rejects:
A) Common-mode signals
B) Differential signals
C) Input offset voltage
D) Output noise
Answer: A) Common-mode signals
Explanation: Differential amplifiers amplify voltage differences while rejecting common-mode interference.

Q51. The CPI (cycles per instruction) of a pipelined processor ideally approaches:
A) 0
B) 1
C) 2
D) Infinity
Answer: B) 1
Explanation: In ideal pipelining, one instruction completes every cycle, so CPI = 1.

Q52. Which of the following logic gates is *functionally complete*?
A) AND
B) OR
C) NAND

D) XOR
Answer: C) NAND
Explanation: NAND alone can implement all basic logic functions (NOT, AND, OR).

Q53. The maximum power transfer occurs when load resistance equals:
A) Source voltage
B) Source current
C) Source resistance
D) Zero
Answer: C) Source resistance
Explanation: According to the maximum power transfer theorem, $R_L = R_S$.

Q54. In C, the output of printf("%d", sizeof(printf("Hello"))); is:
A) 5
B) 6
C) Compiler dependent
D) Size of integer return type
Answer: D) Size of integer return type
Explanation: printf returns an int, so sizeof gives sizeof(int) (usually 4 bytes).

Q55. Which data structure is used to implement recursion?
A) Queue
B) Stack
C) Array
D) Linked list
Answer: B) Stack
Explanation: Function calls and recursive invocations are managed through the call stack.

Q56. The average-case time complexity of QuickSort is:
A) $O(n^2)$
B) O(n log n)
C) O(log n)

D) O(n)
Answer: B) O(n log n)
Explanation: On average, QuickSort divides data efficiently, giving O(n log n).

Q57. In relational algebra, the θ-join operation combines tuples based on:
A) Cartesian product only
B) Matching attribute values
C) Conditional comparison
D) Natural key
Answer: C) Conditional comparison
Explanation: θ-join merges relations using a general condition like A.id < B.id.

Q58. The principle of *locality of reference* in OS means:
A) Data access is random
B) Consecutive instructions access nearby locations
C) All memory is accessed equally
D) Paging reduces performance
Answer: B) Consecutive instructions access nearby locations
Explanation: Programs often access nearby instructions/data, enabling caching efficiency.

Q59. The minimum number of bits required to represent 256 unique values is:
A) 7
B) 8
C) 9
D) 10
Answer: B) 8
Explanation: $2^8 = 256$; hence 8 bits are needed.

Q60. In software project estimation, *COCOMO* model is primarily used to estimate:
A) Memory usage
B) Development effort and cost
C) CPU time

D) Error rate
Answer: B) Development effort and cost
Explanation: COCOMO predicts project cost, effort, and duration based on size and complexity.

Q61. A digital signature ensures:
A) Confidentiality only
B) Authentication and integrity
C) Non-encryption verification
D) Data compression
Answer: B) Authentication and integrity
Explanation: Digital signatures verify sender authenticity and detect message alterations.

Q62. Which HTML5 feature allows local storage of key-value pairs without cookies?
A) IndexedDB
B) LocalStorage
C) WebSQL
D) SessionStorage
Answer: B) LocalStorage
Explanation: LocalStorage stores persistent data in the browser for the same origin.

Q63. The Boolean function $(A + B')(A' + B)$simplifies to:
A) AB
B) A $\oplus$ B
C) A'B'
D) A + B
Answer: B) A $\oplus$ B
Explanation: (A + B')(A' + B) is equivalent to the XOR function.

Q64. A diode conducts when:
A) Forward biased beyond threshold voltage

B) Reverse biased
C) Zero bias
D) Reverse breakdown only
Answer: A) Forward biased beyond threshold voltage
Explanation: A silicon diode conducts after ~0.7V forward bias.

Q65. In Java, which concept allows multiple methods with the same name but different parameters?
A) Overriding
B) Overloading
C) Inheritance
D) Encapsulation
Answer: B) Overloading
Explanation: Method overloading allows same-name methods with different parameter lists.

Q66. Which traversal technique prints a Binary Search Tree in ascending order?
A) Preorder
B) Postorder
C) Inorder
D) Level order
Answer: C) Inorder
Explanation: Inorder traversal of a BST outputs nodes in sorted order.

Q67. The algorithmic complexity of Dijkstra's shortest path using a min-priority queue is:
A) $O(V^2)$
B) $O(V \log V + E \log V)$
C) $O(E^2)$
D) $O(V + E)$
Answer: B) $O(V \log V + E \log V)$
Explanation: Using a binary heap, Dijkstra's algorithm achieves near-linear efficiency for sparse graphs.

Q68. In DBMS, the serializability concept ensures:
A) Transactions follow serial execution order
B) Transactions are independent
C) Deadlocks cannot occur
D) All updates are permanent
Answer: A) Transactions follow serial execution order
Explanation: Serializability guarantees concurrent transactions' outcome equals that of a serial schedule.

Q69. Thrashing in OS occurs when:
A) CPU utilization is high
B) Processes frequently swap pages
C) Memory is underutilized
D) Disk I/O is zero
Answer: B) Processes frequently swap pages
Explanation: Excessive paging (swapping) leads to low CPU utilization — known as thrashing.

Q70. Which protocol provides email sending functionality?
A) POP3
B) SMTP
C) IMAP
D) FTP
Answer: B) SMTP
Explanation: Simple Mail Transfer Protocol handles outgoing email.

Q71. The *V-model* in software engineering emphasizes:
A) Parallel testing and development
B) Strict sequential development
C) Prototyping approach
D) Continuous integration
Answer: A) Parallel testing and development
Explanation: The V-model maps each development stage to a corresponding testing phase.

Q72. The process of verifying a user's identity before granting system access is:
A) Authorization
B) Authentication
C) Accounting
D) Encryption
Answer: B) Authentication
Explanation: Authentication confirms the identity, while authorization defines permissions.

Q73. The <meta> tag in HTML is used for:
A) External styling
B) Storing metadata like keywords and viewport settings
C) Script execution
D) Embedding multimedia
Answer: B) Storing metadata like keywords and viewport settings
Explanation: <meta> provides metadata for search engines and browser behavior.

Q74. The Boolean function $A'B + AB'$ represents which gate?
A) AND
B) OR
C) XOR
D) NOR
Answer: C) XOR
Explanation: $A'B + AB'$ is the canonical form of XOR operation.

Q75. The slew rate of an op-amp is defined as:
A) Maximum change in output voltage per unit time
B) Input offset voltage
C) Differential input impedance
D) Common-mode gain
Answer: A) Maximum change in output voltage per unit time

Explanation: Slew rate indicates how fast an op-amp can respond to rapid input changes.

Q76. In a RISC processor, one instruction is typically executed:
A) In one clock cycle
B) In multiple micro-instructions
C) Using complex addressing modes
D) Only by microcode
Answer: A) In one clock cycle
Explanation: RISC architecture simplifies instructions for single-cycle execution to increase throughput.

Q77. The Boolean function $A + AB'$ simplifies to:
A) A
B) B
C) A + B
D) AB
Answer: A) A
Explanation: $A + AB' = A(1 + B') = A$.

Q78. A BJT operates in active region when:
A) Base–emitter and base–collector are both reverse biased
B) Base–emitter forward biased, base–collector reverse biased
C) Both junctions forward biased
D) Collector–emitter shorted
Answer: B) Base–emitter forward biased, base–collector reverse biased
Explanation: That bias condition enables transistor amplification.

Q79. In C, the statement int *ptr = malloc(sizeof(int)); requires which header?
A) <string.h>
B) <stdlib.h>
C) <malloc.h>
D) <stdio.h>
Answer: B) <stdlib.h>

Explanation: malloc() and memory allocation functions are declared in <stdlib.h>.

Q80. Which data structure supports efficient median finding in streaming data?
A) Stack
B) Two Heaps (max-heap + min-heap)
C) AVL tree only
D) Linked list
Answer: B) Two Heaps (max-heap + min-heap)
Explanation: Balanced heaps maintain lower and upper halves for O(log n) median updates.

Q81. The worst-case time complexity of Merge Sort is:
A) O(n)
B) O(n log n)
C) $O(n^2)$
D) O(log n)
Answer: B) O(n log n)
Explanation: Merge Sort consistently divides and merges arrays producing O(n log n) even in worst case.

Q82. Which relational algebra operation is equivalent to SQL's SELECT with WHERE clause?
A) Union
B) Projection
C) Selection
D) Join
Answer: C) Selection
Explanation: Selection (σ) filters tuples based on a predicate.

Q83. In demand paging, page fault rate decreases when:
A) Working-set size increases
B) Page size decreases
C) Swapping increases

D) Disk I/O reduces
Answer: A) Working-set size increases
Explanation: More resident pages reduce faults since needed data stays in memory.

Q84. In IPv4, Class C networks have how many host bits?
A) 8
B) 16
C) 24
D) 32
Answer: A) 8
Explanation: Class C uses /24 mask — 8 bits for host addressing.

Q85. The SDLC phase ensuring code meets design specification is:
A) Requirement analysis
B) Design
C) Verification
D) Implementation testing
Answer: C) Verification
Explanation: Verification confirms conformance of product to design and specifications.

Q86. In cryptography, AES operates on blocks of size:
A) 56 bits
B) 64 bits
C) 128 bits
D) 192 bits
Answer: C) 128 bits
Explanation: AES is a symmetric block cipher processing 128-bit blocks.

Q87. In CSS, position: sticky; behaves like:
A) Absolute only
B) Relative until a threshold, then fixed
C) Fixed always

D) Static positioning
Answer: B) Relative until a threshold, then fixed
Explanation: Sticky elements act relative until scroll crosses their container boundary.

Q88. The Boolean equation $(A + B)(A' + C)$simplifies to:
A) AC + B
B) A + BC
C) B + C
D) A' + B + C
Answer: B) A + BC
Explanation: Expansion gives $AA' + AC + BA' + BC = A + BC$.

Q89. A rectifier converts:
A) AC to DC
B) DC to AC
C) High voltage to low
D) Power to signal
Answer: A) AC to DC
Explanation: Rectifiers use diodes to allow current flow in only one direction.

Q90. In Java, a checked exception must be:
A) Ignored by JVM
B) Declared or handled in code
C) Subclass of RuntimeException
D) Unrecoverable
Answer: B) Declared or handled in code
Explanation: Checked exceptions require throws declaration or try-catch handling.

Q91. Which data structure provides O(1) average lookup using hash function?
A) Stack
B) Hash table
C) Tree

D) Linked list
Answer: B) Hash table
Explanation: Hashing enables constant-time average case for search and insertion.

Q92. The recurrence $T(n) = 2T(n/2) + n^2$ resolves to:
A) O(n)
B) O(n log n)
C) O(n²)
D) O(n³)
Answer: C) O(n²)
Explanation: Master theorem: $a = 2, b = 2, f(n) = n^2 \Rightarrow T(n) = \Theta(n^2)$.

Q93. In DBMS, cascading rollback happens due to:
A) Lost update
B) Dirty read
C) Deadlock
D) Phantom read
Answer: B) Dirty read
Explanation: If a transaction reads uncommitted data from another that later aborts, rollbacks cascade.

Q94. A page table entry typically does **not** contain:
A) Frame number
B) Protection bits
C) Page reference counter
D) Virtual address
Answer: D) Virtual address
Explanation: Virtual address indexes the page table; it isn't stored inside entries.

Q95. The 3-way TCP handshake sequence is:
A) SYN → ACK → SYN-ACK
B) SYN → SYN-ACK → ACK

C) ACK → SYN → SYN-ACK
D) SYN-ACK → ACK → SYN
Answer: B) SYN → SYN-ACK → ACK
Explanation: Connection initiation uses three packets establishing reliable session.

Q96. In software testing, "mutation testing" evaluates:
A) Code complexity
B) Test case effectiveness
C) User requirements
D) Algorithm speed
Answer: B) Test case effectiveness
Explanation: Small code changes (mutations) verify whether tests detect introduced faults.

Q97. The principle "least privilege" in security means:
A) Denying all access
B) Granting only minimal rights needed
C) Providing admin rights to all
D) Allowing unrestricted access temporarily
Answer: B) Granting only minimal rights needed
Explanation: Minimizing permissions reduces potential attack surface.

Q98. The <iframe> tag in HTML is used to:
A) Insert an inline frame (another webpage)
B) Display images
C) Embed CSS styles
D) Add form controls
Answer: A) Insert an inline frame (another webpage)
Explanation: <iframe> loads an external HTML document within the current page.

Q99. The Boolean function $(A + B')(A' + B')$simplifies to:
A) B'

B) A + B
C) A'B'
D) A ⊕ B
Answer: A) B'
Explanation: Simplify: $A + B' = (A + B')(A' + B') = B'(A + A') = B'$.

Q100. A Schmitt trigger circuit is primarily used for:
A) Frequency multiplication
B) Noise immunity and waveform shaping
C) Voltage regulation
D) Phase shifting
Answer: B) Noise immunity and waveform shaping
Explanation: Schmitt triggers convert noisy or slow-rising signals into clean digital transitions with hysteresis.