



**NATIONAL INSTITUTE OF TECHNICAL TEACHERS
TRAINING AND RESEARCH**
(DEEMED TO BE UNIVERSITY UNDER DISTINCT CATEGORY)
CHANDIGARH

Ph.D. Entrance Examination - January 2025

Subject / Branch / Department :	COMPUTER SCIENCE & ENGG.
Roll No. :	
Candidate Name :	
Date of Examination :	

Maximum Marks: 25 (There is no negative marking)

- Notes:** (a) Only one option to be tick-marked out of the four options given as answer
 (b) The Candidate must put his/her signature with date at the bottom of each page
 (c) For any rough work, please use ONLY back-sides of pages which are left blank

Q1. When a program tries to access a page that is mapped in address space but not loaded in physical memory, then _____	
(a)	segmentation fault occurs
(b)	fatal error occurs
(c)	page fault occurs
(d)	no error occurs
Q2. Which of the following is true for all regular languages?	
(a)	They can be recognized by a finite automaton
(b)	They can be described by a context-free grammar
(c)	They require a push-down automaton for recognition
(d)	They are undecidable
Q3. Which of the following is true about threads within the same process?	
(a)	They share the same CPU but have different memory
(b)	They have separate CPUs
(c)	They share the same memory space.
(d)	None of the above

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Q4. If a process is executing in its critical section, then no other processes can be executing in their critical section. What is this condition called?	
(a)	mutual exclusion
(b)	critical exclusion
(c)	synchronous exclusion
(d)	asynchronous exclusion
Q5. How does a distance-vector routing protocol determine the best route?	
(a)	by counting hops
(b)	by measuring latency
(c)	by bandwidth
(d)	by using a cost metric
Q6. How do routers utilize ICMP messages within the IP framework?	
(a)	To encrypt data packets
(b)	To prioritize packets
(c)	To diagnose routing issues
(d)	To compress data packets
Q7. Which feature of IPv6 eliminates the need for NAT (Network Address Translation)?	
(a)	Auto-configuration
(b)	Built-in encryption
(c)	The vast address space
(d)	Multicast
Q8. What is the property of a balanced binary search tree (BST)?	
(a)	The left and right subtrees' heights differ by at most one
(b)	Each subtree is a full tree
(c)	Each subtree is a complete binary tree
(d)	All leaf nodes are at the same level
Q9. What distinguishes depth-first search (DFS) from breadth-first search (BFS) in graph traversal?	
(a)	DFS uses a queue, while BFS uses a stack
(b)	BFS uses a queue, while DFS uses a stack
(c)	DFS can find the shortest path; BFS cannot
(d)	DFS is recursive, while BFS cannot be made recursive

Q10. How does pipelining improve the performance of a CPU?	
(a)	By increasing clock speed
(b)	By reducing instruction length
(c)	By storing more data
(d)	By executing multiple instructions in parallel
Q11. A CPU is not executing instructions in the correct sequence. What could be the problem?	
(a)	Cache failure
(b)	ALU failure
(c)	Faulty Program Counter
(d)	Memory overflow
Q12. Which of the following is not a fundamental Boolean operation?	
(a)	AND
(b)	OR
(c)	ADDITION
(d)	NOT
Q13. Which of the following is a combinational circuit?	
(a)	Flip-Flop
(b)	Counter
(c)	Adder
(d)	Register
Q14. In a 4-to-1 multiplexer, how many selection lines are required?	
(a)	1
(b)	2
(c)	3
(d)	4
Q15. Which type of circuit is used to store data and is synchronized with a clock signal?	
(a)	Combinational
(b)	Asynchronous
(c)	Sequential
(d)	None of the above

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Q16. Which method is used for the minimization of Boolean functions?

- (a) De Morgan's Theorem
- (b) Karnaugh Map (K-Map)
- (c) Truth Table
- (d) Venn Diagram

Q17. Which of the following addressing modes uses a register to hold the address of the operand?

- (a) Immediate
- (b) Direct
- (c) Register Indirect
- (d) Indexed

Q18. In which addressing mode is the operand specified by an offset relative to the current instruction?

- (a) Immediate
- (b) Direct
- (c) Relative
- (d) Indexed

Q19. What is the full name of FAT?

- (a) File attribute table
- (b) File allocation table
- (c) Font attribute table
- (d) Format allocation table

Q20. In a CPU, what connects the ALU, registers, and other components?

- (a) Data Bus
- (b) Control Unit
- (c) Data-Path
- (d) Instruction Set

Q21. Which type of pipeline hazard occurs when two instructions require the same hardware resource at the same time?

- (a) Data Hazard
- (b) Control Hazard
- (c) Structural Hazard
- (d) Instruction Hazard

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Q22.	Which of the following automata can recognize context-free languages?
(a)	Finite Automaton
(b)	Push-Down Automaton
(c)	Turing Machine
(d)	Linear-Bounded Automaton
Q23.	The pumping lemma for context-free languages is used to prove that:
(a)	A) A language is regular
(b)	B) A language is not regular
(c)	C) A language is context-free
(d)	D) A language is not context-free
Q24.	Which of the following tools is used for lexical analysis?
(a)	YACC
(b)	Lex
(c)	GCC
(d)	GDB
Q25.	Which of the following is NOT part of a runtime environment?
(a)	Stack
(b)	Heap
(c)	Registers
(d)	Intermediate Code

ANSWER KEYS (CSE)

CSE

Q1.	Ans. c
Q2.	Ans. a
Q3.	Ans. c
Q4.	Ans. a
Q5.	Ans. a
Q6.	Ans. c
Q7.	Ans. c
Q8.	Ans. a
Q9.	Ans. b
Q10.	Ans. d
Q11.	Ans. c
Q12.	Ans. c
Q13.	Ans. c
Q14.	Ans. b
Q15.	Ans. c
Q16.	Ans. b
Q17.	Ans. c
Q18.	Ans. c
Q19.	Ans. b
Q20.	Ans. c
Q21.	Ans. c
Q22.	Ans. b
Q23.	Ans. d
Q24.	Ans. b
Q25.	Ans. d
