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

Ph.D. Entrance Examination - December 2025 Session

Subject / Branch / Department	:	
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.	For a fair die, probability of getting a number > 4 is
(a)	1/6
(b)	1/3
(c)	1/2
(d)	2/3
Q2.	Which of the following is a universal gate?
(a)	NAND
(b)	OR
(c)	XOR
(d)	AND
Q3.	The 2's complement of binary 1010 is:
(a)	0101
(b)	1010
(c)	0111
(d)	0110
Q4.	Which addressing mode uses the instruction operand as the actual value?
(a)	Indirect
(b)	Direct
(c)	Immediate
(d)	Indexed

Q5.	Pipeline hazards are of types
(a)	Structural, Data, Control
(b)	Data, Memory, Branch
(c)	Arithmetic, Control, Memory
(d)	Structural, Storage, Delay

Q6.	Cache memory is faster because:
(a)	Uses DRAM
(b)	Uses SRAM
(c)	Is located on hard disk
(d)	Uses virtual memory

Q7.	DMA is used for:
(a)	CPU scheduling
(b)	File system management
(c)	Fast memory access bypassing CPU
(d)	Virtual memory management

Q8.	Pumping lemma is used to prove:
(a)	Regularity
(b)	Irregularity
(c)	Both a & b
(d)	Undecidability

Q9.	Turing machine is more powerful than PDA because:
(a)	It has more states
(b)	It can store context
(c)	It has an infinite tape
(d)	None

Q10.	Lexical analysis outputs:
(a)	Tokens
(b)	Parse tree
(c)	Syntax tree
(d)	Intermediate code

Q11.	Three-address code is used in:
(a)	Lexical analysis
(b)	Parsing
(c)	Intermediate code generation
(d)	Machine code generation

Q12.	SQL command to remove a table is:
(a)	DELETE
(b)	TRUNCATE
(c)	REMOVE
(d)	DROP

Q13.	Which normal form removes partial dependency?
(a)	1NF
(b)	2NF
(c)	3NF
(d)	BCNF

Q14.	Relational algebra operation equivalent to SQL SELECT is:
(a)	Projection
(b)	Join
(c)	Selection
(d)	Union

Q15.	B+ tree differs from B-tree because:
(a)	All values stored only in leaves
(b)	Keys stored only in root
(c)	Balancing is not required
(d)	Allows duplicates

Q16.	OS classifies the threads as
(a)	Kernel and user level
(b)	Memory and Security Level
(c)	OS and CPU Level
(d)	Mainframe and Motherboard Level

Q17.	When can the binding of instructions and data to memory addresses be done?
(a)	Load Time
(b)	Compile Time
(c)	Execution Time
(d)	All of the above

Candidate's Signature with Date

Q18. What action does the ARP process take when a host needs to build a frame, but the ARP cache does not contain an address mapping?

(a)	The ARP process sends out an ARP request to the Ethernet broadcast address to discover the IPv4 address of the destination device
(b)	The ARP process sends out an ARP request to the IPv4 broadcast address to discover the MAC address of the destination device
(c)	The ARP process sends out an ARP request to the Ethernet broadcast address to discover the MAC address of the destination device.
(d)	The ARP process sends out an ARP request to the IPv4 broadcast address to discover the IPv4 address of the destination device.

Q19. Which type of routing algorithm does OSPF use?

(a)	Distance Vector
(b)	Link State
(c)	Path Vector
(d)	Hybrid

Q20. If a device is not receiving an IP address via DHCP over Ethernet, what layer should be investigated?

(a)	Data Link
(b)	Application
(c)	Network
(d)	Presentation

Q21. What operation is typically more efficient in a linked list compared to an array?

(a)	Accessing an element by index
(b)	Appending an element to the end
(c)	Inserting an element at the beginning
(d)	Searching for an element

Q22. A developer finds that their binary heap does not maintain the correct order after several insertions and deletions. What is the likely issue?

(a)	The heapify process is not correctly implemented
(b)	The heap is not balanced correctly after operations
(c)	Keys are not compared correctly during insertions
(d)	All of the above

Q23. How does the greedy algorithm approach differ from dynamic programming in solving problems?

(a)	Greedy algorithms are easier to implement than dynamic programming solutions
(b)	Greedy algorithms make a sequence of choices that may not lead to an optimal solution, while dynamic programming ensures an optimal solution by considering all possible solutions
(c)	Greedy algorithms can solve a wider range of problems than dynamic programming
(d)	Dynamic programming is only suitable for problems with a linear structure

Q24. Which of the following is an advantage of adjacency list representation over adjacency matrix representation of a graph?

(a)	In adjacency list representation, space is saved for sparse graphs
(b)	DFS and BSF can be done in $O(V + E)$ time for adjacency list representation. These operations take $O(V^2)$ time in adjacency matrix representation. Here is V and E are number of vertices and edges respectively.
(c)	Adding a vertex in adjacency list representation is easier than adjacency matrix representation.
(d)	All of the above

Q25. The time complexity of binary search in best and worst cases for an array of size N is

(a)	N, N2
(b)	log N, N2
(c)	1, N log N
(d)	1, log N

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Computer Sc. & Engg. keys

Answer Sheet

Question No	Answer
1)	Answer: b
2)	Answer: a
3)	Answer: d
4)	Answer: c
5)	Answer: a
6)	Answer: b
7)	Answer: c
8)	Answer: b
9)	Answer: c
10)	Answer: a
11)	Answer: c
12)	Answer: d
13)	Answer: b
14)	Answer: c
15)	Answer: a
16)	Answer: a
17)	Answer: d
18)	Answer: c
19)	Answer: b

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20)	Answer: a
21)	Answer: c
22)	Answer: a
23)	Answer: b
24)	Answer: d
25)	Answer: d

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