Ph. D. ENTRANCE TEST (PET) 2025

Signature of Invigilator

Roll. No.

Paper - II
Computer Science

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Maximum Marks: 50   **No. Of Printed Pages: 8**

Instruction for the Candidate:

1. This paper consists of **FIFTY (50)** multiple choice type questions. Each Question carries **ONE (1)** mark.
2. There is no Negative Marking for Wrong Answer.
3. A separate OMR Answer Sheet has been provided to answer questions. Your answers will be evaluated based on your response in the OMR Sheet only. No credit will be given for any answering made in question booklet.
4. Defective question booklet or OMR if noticed may immediately replace by the concerned invigilator.
5. Write roll number, subject code, booklet type, category and other information correctly in the OMR Sheet else your OMR Sheet will not be evaluated by machine.
6. Select most appropriate answer to the question and darken appropriate oval on the OMR answer sheet, with black / blue ball pen only. DO NOT USE PENCIL for darkening. In case of over writing on any answer, the same will be treated as invalid. Each question has exactly one correct answer and has four alternative responses (A), (B), (C) and (D). You have to darken the circle as indicated below on the correct response against each item.
   Example: Ⓐ ● Ⓒ Ⓓ where (B) is correct response.
7. Rough Work is to be done in the end of this booklet.
8. If you write your Name, Roll Number, Phone Number or put any mark on any part of the OMR Answer Sheet, except for the space allotted for the relevant entries, which may disclose your identity, or use abusive language or employ any other unfair means, such as change of response by scratching or using white fluid, you will render yourself liable to disqualification.
9. Calculators, Log tables any other calculating devices, mobiles, slide rule, text manuals etc are NOT allowed in the examination hall. If any of above is seized from the candidates during examination time; he/ she will be immediately debarred from the examination and corresponding disciplinary action will be initiated by the Center Supervisor as deemed fit.
10. DO NOT FOLD or TEAR OMR Answer sheet as machine will not be able to recognize torn or folded OMR Answer sheet.
11. **You have to return the OMR Answer Sheet to the invigilator at the end of the examination compulsorily** and must not carry it with you outside the Examination Hall. You are however, allowed to carry original question booklet on conclusion of examination.

Paper - II
Computer Science

Note: This paper contains **FIFTY (50)** multiple-choice questions. Each Question carries **ONE (1)** mark.

1. What is a semantic error?
   A. Error in meaning
   B. Error in symbols
   C. Error in tokens
   D. Error in syntax

2. Shift-reduce parsing is associated with
   A. Top-down parsing
   B. Bottom-up parsing
   C. Predictive parsing
   D. Recursive descent parsing

3. Which graph algorithm is commonly used to detect cycles in a directed graph?
   A. DFS
   B. BFS
   C. Prim's Algorithm
   D. Dijkstra's Algorithm

4. The Floyd-Warshall algorithm is used to find:
   A. Minimum spanning tree
   B. All pairs shortest paths
   C. Topological order
   D. Strongly connected components

5. In dynamic programming, subproblems are typically:
   A. Independent
   B. Overlapping
   C. Non-recursive
   D. None of the above

6. Which algorithm is used to find strongly connected components in a graph?
   A. Kruskal's Algorithm
   B. Tarjan's Algorithm
   C. Prim's Algorithm
   D. Bellman-Ford Algorithm

7. The adjacency matrix of a sparse graph is usually:
   A. Space efficient
   B. Space inefficient
   C. Time efficient
   D. Unused

8. Which data structure is most suitable for Dijkstra's algorithm implementation?
   A. Stack
   B. Priority Queue
   C. Array
   D. Linked List

9. Which sorting algorithm is NOT comparison based?
   A. Quick Sort
   B. Heap Sort
   C. Radix Sort
   D. Merge Sort

10. The worst-case time complexity of Quick Sort is:
    A. $O(n \log n)$
    B. $O(n^2)$
    C. $O(n)$
    D. $O(\log n)$

11. Which of the following can only accept regular languages?
    A. Turing Machine
    B. Pushdown Automaton
    C. DFA
    D. Context Sensitive Grammar

12. In the Chomsky hierarchy, Type-2 grammars are:
    A. Regular
    B. Context-Free
    C. Context-Sensitive
    D. Unrestricted

[P.T.O]

13. If a language is not regular, the pumping lemma can be used to:
A. Prove it's regular
B. Prove it's not regular
C. Prove it's context-free
D. Prove it's recursive

14. Which automaton uses a stack memory?
A. DFA
B. NFA
C. PDA
D. Turing Machine

15. Which is true about DFA and NFA?
A. DFA is more powerful
B. NFA is more powerful
C. Both have same power
D. None

16. How many 2-input multiplexers are required to construct a 2^{10} input multiplexer?
A. 1023
B. 10
C. 128
D. 256

17. A + A'B can be simplified as
A. A + B
B. B
C. A
D. 0

18. An invertor at the output of a NAND gate functions similar to
A. EX-OR GATE
B. OR GATE
C. AND GATE
D. NOT GATE

19. Universal register can
A. Shift data right and load data in parallel
B. Shift data in right and left
C. Shift data in right and left as well load the data in parallel
D. None of the Above

20. Let $(FAB)_{16} = (x)_8$. The value of x is
A. 151011
B. 872
C. 512
D. 7653

21. Which one is not a technique of Deadlock Prevention?
A. Maintaining the mutual exclusion condition
B. Attacking the Hold and Wait condition
C. Attacking the circular wait
D. A AND C

22. What information is not contained in i-node of UNIX?
A. File Size
B. Protection information
C. Count of number of directories that point to the i-node
D. Address of Next i-node

23. For MS-DOS Operating System, what is the maximum size of the partition of a hard disc, if FAT-16 file system is implemented with 4 KB block size?
A. 128 MB
B. 256 MB
C. 512 MB
D. 1024 MB

24. Probability of page fault is equal to:
A. $0 \leq P \leq 1$ B. 0
C. 1   D. None of Above

25. The principle of locality of reference is applicable for
A. Cache Memory   B. Polling
C. Interrupts   D. FAT

26. From a box containing 4 white and 6 black balls, 3 balls are transferred to another empty box. From new box a ball is drawn and it is black. What is the probability that out of 3 balls transferred 2 are white and one black?
A. 2/6   B. 1/6
C. 1/9   D. 3/13

27. The eigenvector of a real symmetric matrix corresponding to different eigenvalues are:
A. Singular   B. Orthogonal
C. Non-singular   D. Can't Say

28. If two fair dice are tossed, what is the probability that the sum of the numbers on the faces of the dice is strictly greater than 7?
A. 5/12   B. 1/6
C. 1/2   D. 2/3

29. Regular falsi is better than bisection method because of its
A. Accuracy   B. Faster convergence
C. Simplicity   D. Can't say

30. Parallel computers with shared memory are having following property:
A. UMA   B. NUMA
C. PUMA   D. None of Above

31. In a typical ALU, what is the role of the status flags?
A. To store operand values   B. To indicate results of arithmetic or logic operations such as zero or carry
C. To hold the instruction currently being executed   D. To provide addresses for memory access

32. Which addressing mode uses the operand's address directly in the instruction?
A. Direct addressing   B. Indirect addressing
C. Register addressing   D. Immediate addressing

33. In a pipelined processor, what is the term for when an instruction must wait for a previous instruction to complete?
A. Cache miss   B. Hazard
C. Stall   D. Deadlock

34. Which type of cache memory is faster among the following
A. L1   B. L2
C. L3   D. Register

35. What type of machine instruction would typically be used to move data from memory to a register?
A. Load
B. Store
C. Shift
D. Read

36. What is the output of the following code sections?
{ int x=5, y;   y=x%2?0:1;   printf("%d ", y); }
{ int a=5, b=10, c=15, d;   d=a>b && b<c; if (d) printf("0"); else printf("1"); }
A. 0 & 0
B. 0 & 1
C. 1 & 0
D. 1 & 1

37. What will be the postfix expression for the infix expression: A + B * C?
A. ABC*+
B. A+BC*
C. AB+C*
D. A*BC+

38. What is the output of the following code sections?
{ int a[5]={5}, i; for(i=1;i<5;i++) printf("%d ", a[i]); }
A. 5 5 5 5 5
B. 5 0 0 0 0
C. 0 0 0 0
D. 0 0 0 0 0

39. Consider the following operations already performed on stack and queue: enqueue(3), enqueue(5), push(2), push(4), dequeue(), pop(), push(1), enqueue(8), pop(), and deque(). What is the value of deque()+pop()?
A. 10
B. 7
C. 6
D. 9

40. A connected graph with n vertices and n - 1 edges is called _____.
A. Complete Graph
B. Bipartite Graph
C. Hamiltonian Graph
D. Tree

41. B+ trees differ from B trees in that:
A. Only internal nodes store data
B. Only leaf nodes store data
C. Only root stores data
D. They don't allow duplicates

42. In relational data model, a record is referred to as _____.
A. Attribute
B. Set
C. Relation
D. Tuple

43. Consider the relation R(ABCDEFGHI) and FDs are: AB→C (1) A→DE (2) B→F (3) F→GH (4) D→IJ (5). What is the key for R?
A. AC
B. AD
C. AB
D. A

44. In SQL, to apply condition on grouped data in SELECT Query, _____ clause is used.
A. Where
B. Having
C. Group By
D. While

45. In the _____ normal form, a composite attribute is converted to individual/atomic attributes.
A. First
B. Second
C. Third
D. Fourth

46. Which is the class of IPV4 Address 130.193.245.225?
   A. A   B. B
   C. C   D. D

47. What is the bandwidth of a signal that ranges from 40KHz to 4 MHz?
   A. 36 MHz   B. 360 KHz
   C. 3.96 MHz   D. 396 KHz

48. Which one of the following protocols is NOT used to resolve one form of address to another one?
   A. DNS   B. ARP
   C. DHCP   D. RARP

49. Bit stuffing in HDLC adds one extra 0 (zero) whenever there are _____ consecutive 1s in the data.
   A. 5   B. 7
   C. 15   D. 31

50. Which layer of the OSI model is responsible for routing packets between different networks based on logical addresses?
   A. Physical   B. Transport
   C. Session   D. Network

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Rough Work: