Duration: 3hrs   **[Max Marks:80]**

N.B.:   (1) Question No 1 is Compulsory.
        (2) Attempt any three questions out of the remaining five.
        (3) All questions carry equal marks.
        (4) Assume suitable data, if required, and state it clearly.

1   Attempt any FOUR   [20]

 a   Explain ADT. List linear and nonlinear data structures with examples.

 b   Write an algorithm to check for balanced parenthesis in an expression using stack.

 c   Write a short note on Big O notation with examples.

 d   What are the different collision avoidance techniques? Explain

 e   Consider the following graph: Write adjacency matrix and adjacency list.
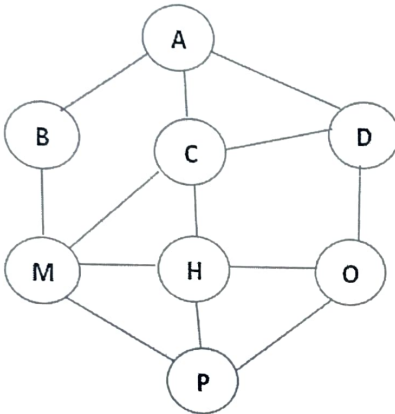
2   a   Write a C program to implement a queue using Arrays. Write a function for   [10]
        Enqueue, Dequeue, and display.

    b   Construct binary search tree. Consider the following list of numbers: 18, 25,16,   [10]
        36, 08, 29, 45, 12, 32, 19

3   a   What is hashing? What properties should a hash function demonstrate?   [10]

    b   Write a C program to implement a stack using a linked list.   [10]

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4 a What is the advantage of a binary search over linear search? Distinguish between [10] linear search and binary search.

b What are Expression Trees? Draw the tree structure for the following expression: [10]

$$(a - 3b)(2x - y)^3$$

5 a Explain insertion sort using an example. Write an algorithm for it and comment [10] on its complexity

b Write short notes on BFS and DFS algorithms. [10]

6 a Write an algorithm to convert infix expression to postfix using stack. [10]

b Write a short note on the implementation of the Huffman tree. [10]

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