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]

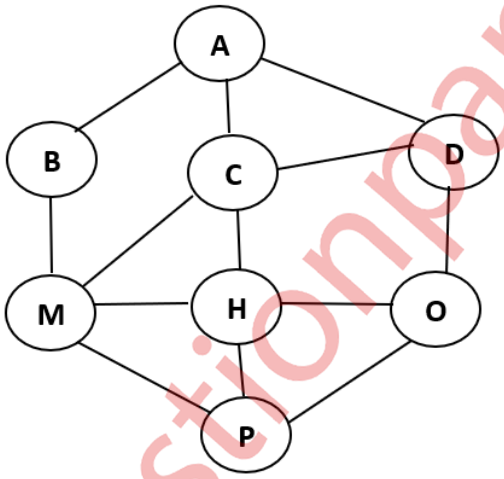
a Explain ADT. List linear and nonlinear data structures with examples.

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 Enqueue, Dequeue, and display. [10]

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

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]

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

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 on its complexity [10]

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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