QP CODE: 19101910

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Reg No : .....

Name : .....

B.Sc./BCA DEGREE (CBCS) EXAMINATION, MAY 2019

Second Semester

Complementary Course - **MM2CMT03 - MATHEMATICS - DISCRETE MATHEMATICS (II)**

(Common For B.Sc Computer Science Model III,Bachelor of Computer Application)

2017 ADMISSION ONWARDS

AFC96493

Maximum Marks: 80 **Time: 3 Hours**

Part A

Answer any **ten** questions.

Each question carries **2** marks.

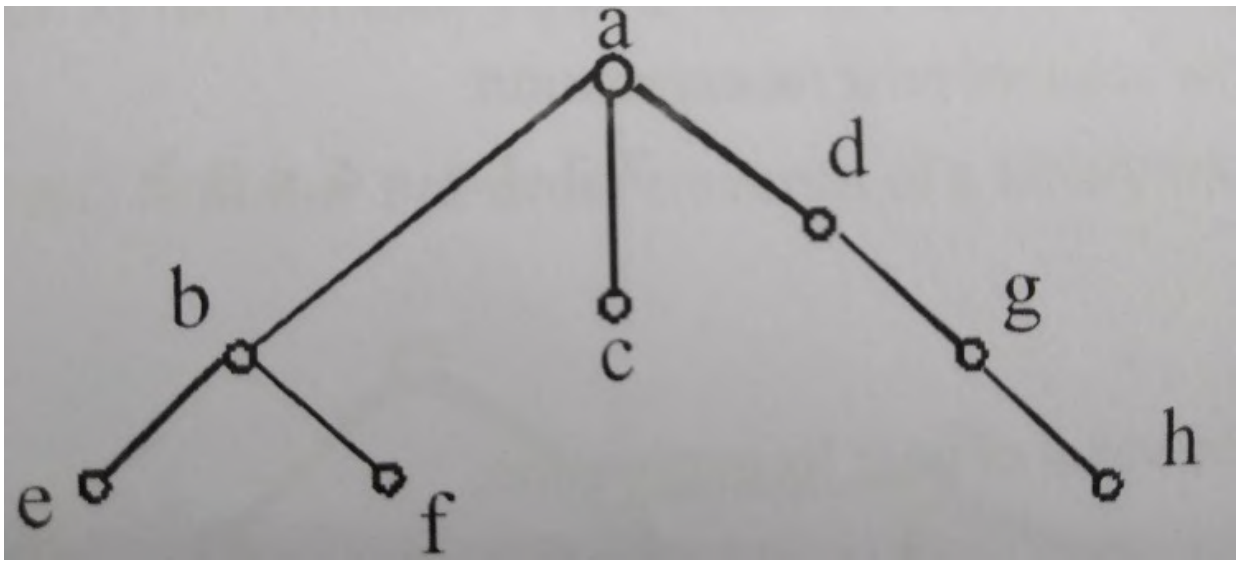
1. Define Bipartite graph.

2. Draw a graph with the adjacency matrix

$$\begin{bmatrix} 0 & 1 & 1 & 0 \\ 1 & 0 & 0 & 1 \\ 1 & 0 & 0 & 1 \\ 0 & 1 & 1 & 0 \end{bmatrix}$$

3. Define the following with example.(a) path (b) walk.

4. Find level of each vertex in a rooted tree. What is the height of the tree?



5. Draw the Binary search tree of ' 30 ,20 , 5 ,60 . 18 .

6. Draw the Binary tree of the algebraic expression.((x+ y) ^ 2) + ((x+ 4) / 3)

7. Find a spanning tree of K5

8. Explain AND gate in Boolean algebra .

9. Check whether the following matrix is skew symmetric

$$A = \begin{pmatrix} 0 & 2 & -6 \\ -2 & 0 & 5 \\ 6 & -5 & 0 \end{pmatrix}$$

10. What is the rank of the matrix given below

$$\begin{pmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{pmatrix}$$

11. Write the characteristic equation of a matrix.

12. State Cayley Hamilton theorem.

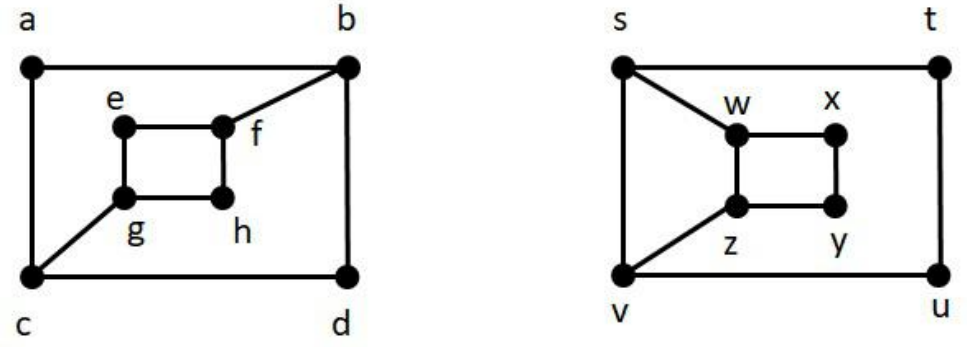
(10×2=20)

Part B

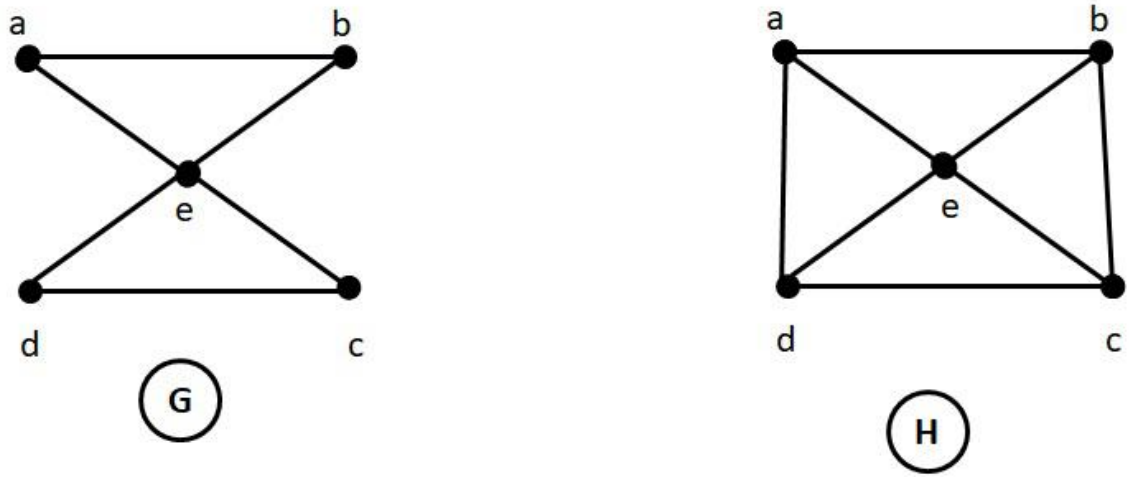
Answer any **six** questions.

Each question carries **5** marks.

13. Determine whether the following graphs are isomorphic

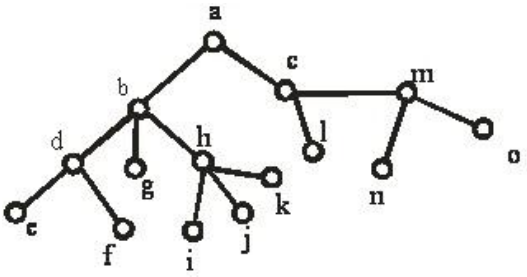


14. Which of the undirected graphs have an Euler circuit ? of those that do not , which have an Euler path?



15. Prove that a connected graph is a tree if there exist a unique path between every pair of vertices .

16. What is pre order traversal? Find the pre order traversal of the following tree.



17. Explain BFS Spanning tree using an example .

18. Find the duals of x (y + 0) , (x + 1) * 0 and $\bar{x}.1 + (\bar{y} + z)$

19. Verify absorption laws x + xy = x and x (x + y) = x

20. Given $A = \begin{pmatrix} 1 & 2 & 1 \\ 0 & 3 & 2 \\ 0 & 0 & 2 \end{pmatrix}$.Find a matrix B such that $AB = I_3$ where I_3 is the identity matrix of order 3.

21. Check the consistency of the following system.

$2x + 5y + 2z = 0$
$-4x + 6z = 0$
$12x - 6y = 0$

(6×5=30)

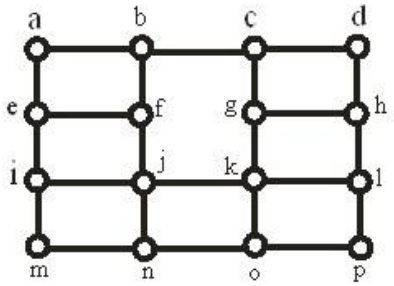
Part C

Answer any **two** questions.

Each question carries **15** marks.

22. Describe graph models with suitable examples.

23. (a) Explain in detail BFS spanning tree of a connected graph.
(b) Find BFS spanning tree of the following graph starting from the vertex ' a ' by explaining steps.



24. Find sum of products 1)$(\bar{x} + y)z$ 2)$(x + \bar{z})y$

25. Find rank of the given matrix by normal form $\begin{pmatrix} 3 & 2 & 7 & 9 \\ 1 & 1 & 9 & 5 \\ 4 & 2 & -2 & 6 \\ -5 & -8 & 3 & 7 \end{pmatrix}$

(2×15=30)