



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

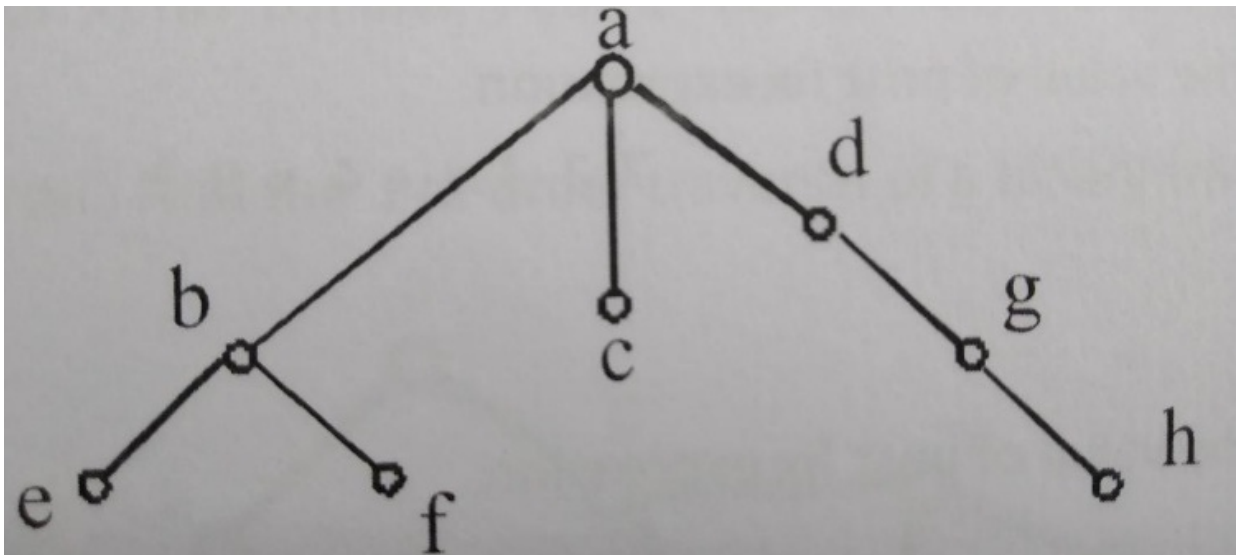
Part A

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 K_5
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.

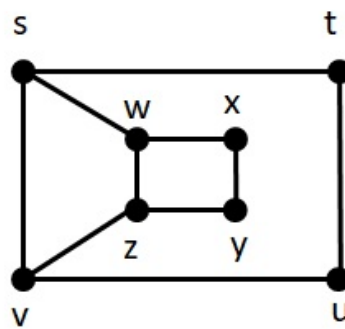
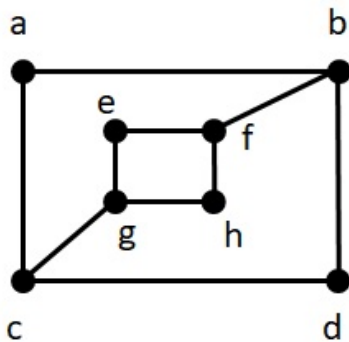
(10×2=20)

Part B

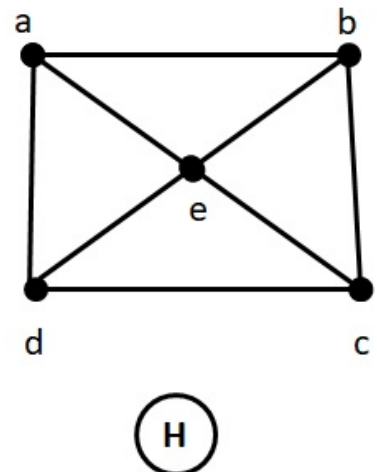
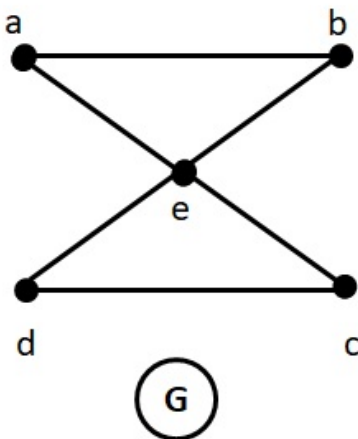
Answer any six questions.

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?

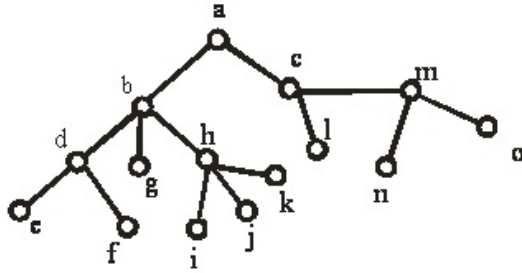


15. Prove that a connected graph is a tree if there exist a unique path between every pair of vertices .





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

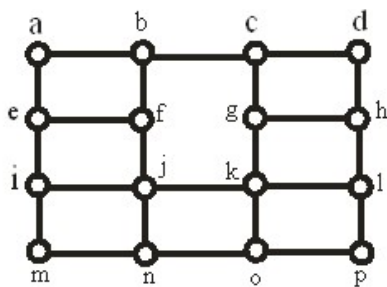
Answer any **two** questions.

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)

