QP CODE: 20101290

20101290

Reg No : .....

Name : .....

B.Sc/BCA DEGREE (CBCS) EXAMINATION, NOVEMBER 2020

Second Semester

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

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

2017 ADMISSION ONWARDS

4B8A46CC

Time: 3 Hours Max. Marks : 80

Part A

*Answer any **ten** questions.*

*Each question carries **2** marks.*

1. Describe directed multigraph.
2. Draw a graph with the adjacency matrix.
$$\begin{bmatrix} 0 & 3 & 0 & 2 \\ 3 & 0 & 1 & 1 \\ 0 & 1 & 1 & 2 \\ 2 & 1 & 2 & 0 \end{bmatrix}$$
3. Define cut vertices. Give example.
4. Draw a Binary tree and write which is the root, internal vertices and leaves.
5. Draw a Binary search tree of the numbers 50, 38 , 28 ,55 ,50 ,25.
6. What is the value of Prefix expression - * 2 / 8 4 3
7. Find a Spanning tree of K 4.
8. Find the values of (a) $1.\bar{0}$ (b) $\overline{(1+0)}$ (c) $1+\bar{1}$ (d) $\bar{0}.0$
9. Define transpose of a matrix.
10. Find the rank of the matrix $\begin{pmatrix} 2 & 3 \\ 4 & 6 \end{pmatrix}$
11. What is the rank of the matrix $\begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 0 \end{pmatrix}$

12. What is a homogeneous equation?

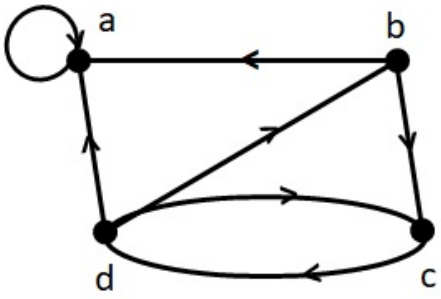
(10×2=20)

Part B

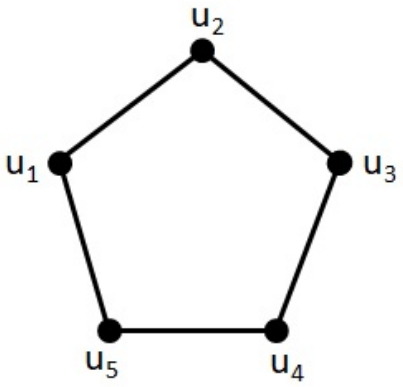
*Answer any **six** questions.*

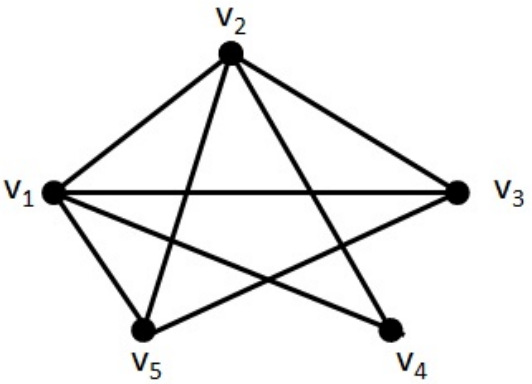
*Each question carries **5** marks.*

13. Determine the sum of the in - degree of the vertices and the sum of the out - degree of the vertices directly. Show that they are both equel to the number of edges in the given graph.



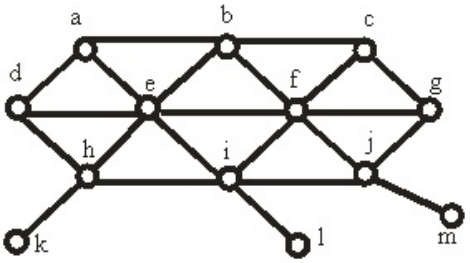
14. Determine whether the following graphs are isomorphic.



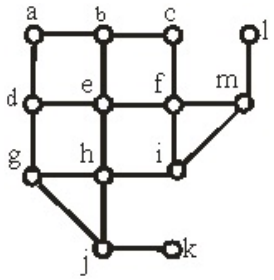


15. Prove that a full ' m-ary ' tree with ' i ' internal vertices contains n = mi + 1 vertices .

16. Find DFS spanning tree of the following graph starting from the vertex ' a ' .



17. Find BFS spannig tree for the following graph starting from the vertex ' a '.



18. Verify associative law x + (y + z) = (x + y) + z and commutative law xy = yx

19. Find the sum of products expansion of F (x , y , z) = $x\bar{y}$

20. Find the rank of matrix $\begin{pmatrix} 5 & 0 & -2 \\ 1 & 4 & 6 \\ 5 & -3 & 7 \end{pmatrix}$ by row canonical form.

21. Find the inverse of the matrix A using Cayley Hamilton theorem where $A = \begin{pmatrix} 4 & 9 \\ 0 & 2 \end{pmatrix}$

(6×5=30)

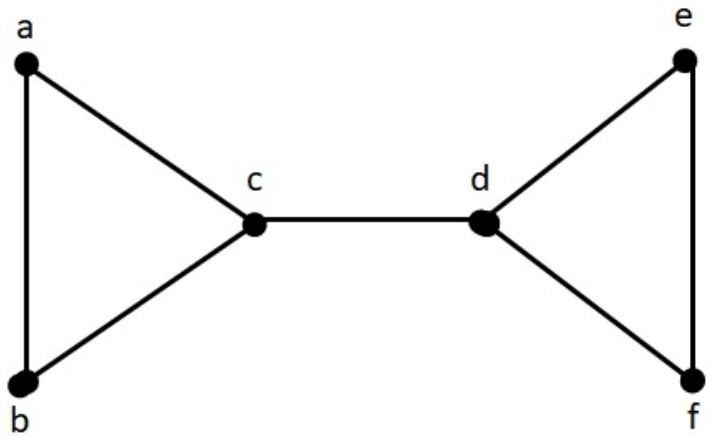
Part C

*Answer any **two** questions.*

*Each question carries **15** marks.*

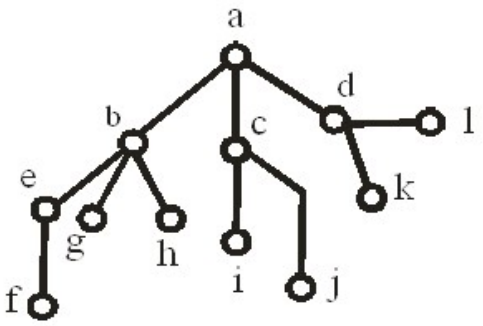
22. (a) Explain Konigsberg Bridge problem.

(b) Does the following graph have a Hamilton path ? If so find such a path. If not give an argument to show why no such path exist.



23. (a) Explain pre order and post order tree traversal algorithms.

(b) Find pre order and post order search of the following rooted tree.



24. Draw a circuit for a fixture controlled by Three Switches

25. Find the eigen values and eigen vectors of the matrix $\begin{pmatrix} 5 & -8 \\ 3 & -6 \end{pmatrix}$

(2×15=30)