QP CODE: 22103290

Reg No	:	....
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B.Sc/BCA DEGREE (CBCS) REGULAR / IMPROVEMENT / REAPPEARANCE EXAMINATIONS, OCTOBER 2022

Second Semester

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

(Common for B.Sc Computer Science Model III, B.Sc Cyber Forensic Model III, Bachelor of Computer Applications)

2017 ADMISSION ONWARDS
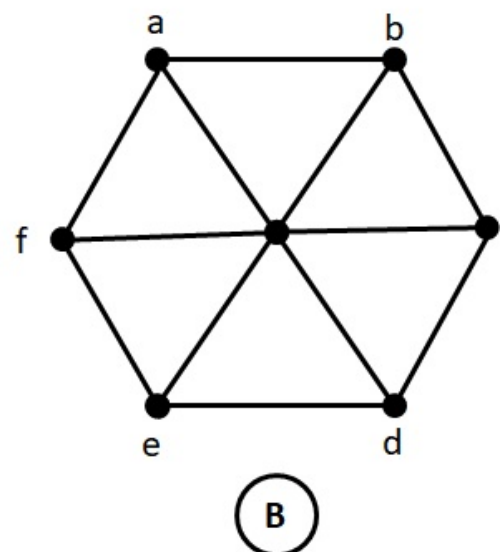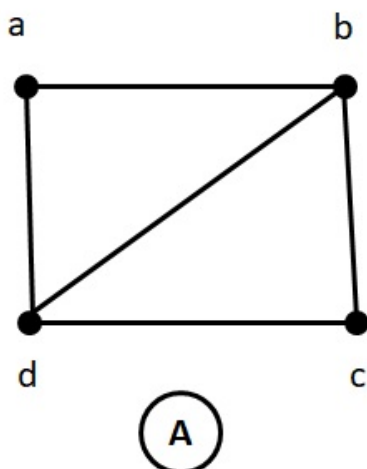
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Time: 3 Hours

Max. Marks : 80

Part A

*Answer any **ten** questions.*

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

1. Draw C_6 and W_4

2. Define isomorphism.

3. Which of the following graphs have an Euler path ?

4. What do you mean by a full m-ary tree ?

5.   What do you mean by Binary search tree ?

6.   Find the value of Postfix expression 9 3 / 5 + 7 2 - *

7.   Define spanning tree of a graph .

8.   Show that $(1.1) + (\overline{0.1}) + 0$=1

9.   Define trace of a matrix with an example.

10. What do you mean by determinant of a matrix?

11. Find the formula for A^{-1} if the characteristic equation of A is $\lambda^2 - 3\lambda + 2 = 0.$

12. Write the augmented matrix from the following system of linear equations
     $$x - y + 6z = 12$$
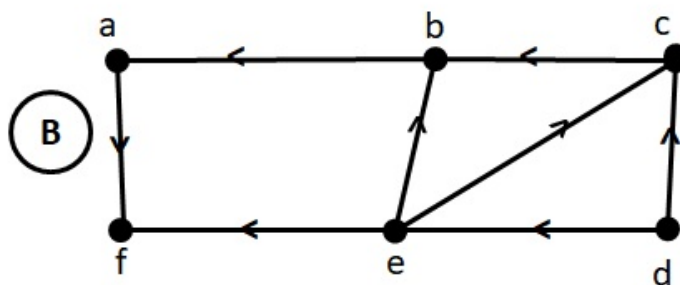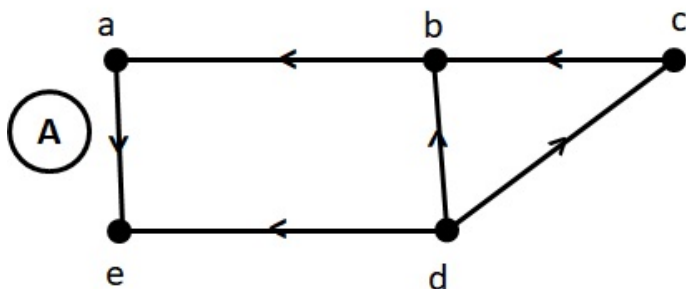 $$2x - 3y + 5z = 4$$
     $$-3x + y + z = 0$$

(10×2=20)

Part B

*Answer any **six** questions.*

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

13. Represent each graph with adjacency matrix (a) K_5 (b) $K_{2,3}$

14. Find the strongly connected components of each of the following graphs.

15. What do you mean by Level of a vertex and Height of a rooted tree ? Draw a rooted tree and find the level of its vertices and the height of the tree .

16. Explain DFS Spanning tree with the help of an example .

17. Find BFS spanning tree of the following graph starting from the vertex ' a '.
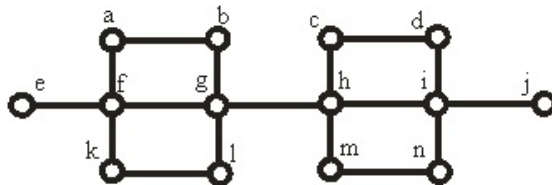
18. Show that the distributive law x (y + z) = xy + xz is valid

19. Construct the table and circuit of Half adder to represent x + y .

20. Find the rank of $\begin{pmatrix} 6 & -1 & 4 \\ 0 & 9 & 7 \\ 3 & 3 & 1 \end{pmatrix}$ by normal form.

21. Find the characteristic equation of the matrix $\begin{pmatrix} 1 & 2 & 0 \\ 2 & 4 & 0 \\ 0 & 3 & 3 \end{pmatrix}$

(6×5=30)

Part C

*Answer any **two** questions.*

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

22. Draw graph models, stating the type of graph used, to represent airline routes where every day there are four flights from Boston to Newark, two flights from Newark to Boston, three flights from Newark to Miami, two flights from Miami to Newark, one flight from Newark to Detroit, two flights from Detroit to Newark,three flights from Newark to Washington, two flights from Washington to Newark, and one flight from Washington to Miami, with (a) an edge between vertices representing cities that have a flight between them.. (b) an edge between vertices representing cities for each flight that operates between them.. (c) an edge between vertices representing cities for each flights that operates between them plus a loop for a specal sightseeing trip that takes off and lands in Miami.

23. (a) Explain the pre order and in order traversal in a rooted tree.
    (b) Find pre order and in order search of the following rooted tree.
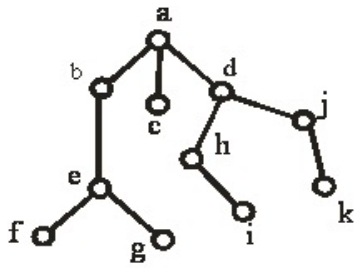
24. Find sum of products expansion for the function 1) $(x + \bar{y})z$ 2) $(\bar{x} + \bar{y})z$

25. Using Cayley-Hamilton theorem find the inverse of the following matrix

$$A = \begin{pmatrix} 2 & 5 & 7 \\ 0 & 4 & 6 \\ 0 & 0 & -3 \end{pmatrix}$$

(2×15=30)