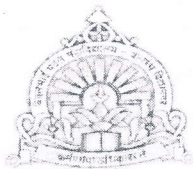


Sample Paper for BSC / BCA /MSC



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Affiliated to Sardar Patel University

VALLABH VIDYANAGAR-388120



BCA (Semester 3) Internal Examination - 2025

COURSE CODE: USO3AEBCA06

COURSE NAME: Discrete Mathematics

Date: 27/09/2025

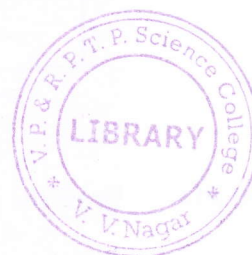
Time: 02:45 P.M. to 03:45 P.M

Total marks :20

Q-1

Answer the following

- If $\vec{a} = (2,3)$, $\vec{b} = (1,4)$ then find $\vec{a} \cdot \vec{b} = ?$
a) 10 b) 14 c) 8 d) 20
- Matrix addition is possible only when:
a) Matrices are square b) Matrices have same order
c) Matrices are symmetric d) Determinants exist
- For $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$, $|A| = ?$
a) -2 b) 2 c) -5 d) -10
- A graph in which all vertices have the same degree is called: ____
a) Complete graph b) Bipartite graph c) Regular graph d) Planar graph
- A planar graph is one that can be drawn in a plane without: ____
a) Vertices b) Crossings of edges c) Paths d) Loops
- A subgraph of G is a graph in which: ____
a) Vertices are same but edges differ c) Only edges are chosen, not vertices
b) Some vertices and some edges of G are selected d) None



6 Marks

Q-2(a)

Prove that $(AB)^T = B^T A^T$ where $A = \begin{bmatrix} 1 & -2 & 5 \\ 4 & -3 & 6 \\ 1 & 5 & 7 \end{bmatrix}$, $B = \begin{bmatrix} 2 & 1 & 1 \\ 1 & 1 & -1 \\ 4 & 0 & 3 \end{bmatrix}$

4 Mark

Q-2(b)

Let $u = (5,4,1,2)$, $v = (-3,0,4,7)$ & $w = (0,5,-8,2)$ then find
(1) $3u + 2v + 6w$, (2) $\|w\|$, (3) $\|3u + 4v\|$

3Marks

OR

Q-2(a)

Let $A = \begin{bmatrix} 2 & 0 & -3 \\ 1 & 4 & 5 \end{bmatrix}$, $B = \begin{bmatrix} 3 & 1 \\ -1 & 0 \\ 4 & 2 \end{bmatrix}$, $C = \begin{bmatrix} 4 & 7 \\ 2 & 1 \\ 1 & -1 \end{bmatrix}$, Find $(AB + AC)?$

3Marks

P.T.O

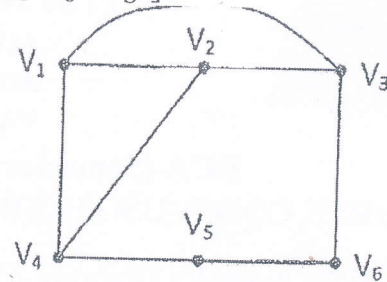
Q-2(b) For the matrix below obtain $\det(A)$, $\det(B)$ and $\det(A+B)$.

$$A = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 6 & 0 \\ 0 & -1 & -1 \end{bmatrix}, B = \begin{bmatrix} 2 & 5 & 1 \\ 1 & 1 & -1 \\ 4 & 0 & 3 \end{bmatrix}$$

4Marks

Q-3(a) Consider the graph G as

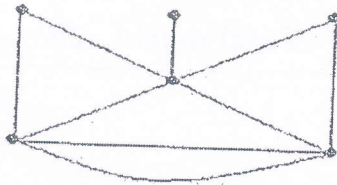
- (1) Find all simple paths from V_1 to V_6 .
- (2) Find all trails from V_1 to V_6 .
- (3) Find $d(V_1, V_6)$.
- (4) Find all cycle in G



3Marks

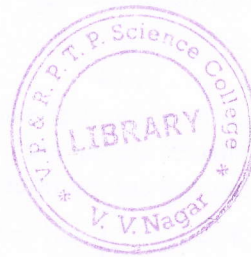
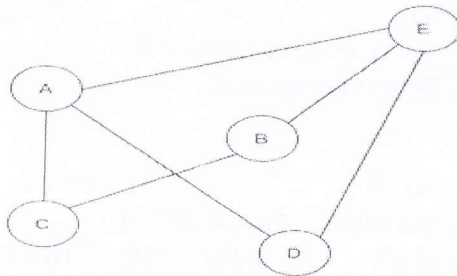
Q-3(b) State Euler's formula for planar graph. Verify Euler's formula for the following graphs

4Marks



OR

Q-3 (a) Draw the adjacency matrix from the graph

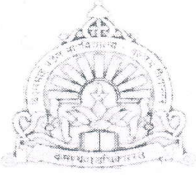


3Marks

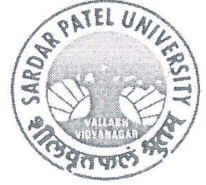
Q-3 (b)

Draw the multigraph whose adjacency matrix is $A = \begin{bmatrix} 0 & 0 & 1 & 0 & 1 \\ 0 & 1 & 0 & 1 & 1 \\ 1 & 0 & 0 & 1 & 0 \\ 0 & 1 & 1 & 0 & 2 \\ 1 & 1 & 0 & 2 & 0 \end{bmatrix}$

4Marks



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BCA Semester 3 Quiz - 2025

COURSE CODE:US03AEBCA06 COURSE TITLE: Discrete Mathematics

Date: 27/09/2025

Day: Saturday

Time: Maximum 10 minutes

Total marks :05

Q-1 Fill in the blanks with appropriate answer given in the bracket. OR Answer with either true or false.

- (i) _____ of the following is true about a graph in graph theory.
((1)A graph consists of vertices only, (2)A graph consists of edges only, (3) A graph consists of vertices and edges, (4)A graph consists of vertices, edges, and weights only)
- (ii) A symmetric matrix satisfies the condition $A^T = A$. (True/False)
- (iii) Isomorphic graphs always have identical degree sequences. (True/False)
- (iv) A simple graph allows self-loops and multiple edges. (True/False)
- (v) A square matrix must always have the same number of rows and columns. (True/False)

