SARDAR PATEL UNIVERSITY

B.SC (CA&IT) (Regular)/M.SC (Integrated) (NC) SEM-I EXAMINATION 2016

TUESDAY, 18TH OCTOBER

10:00 AM TO 12:00 NOON

PS01FIIT02: MATHEMATICS-I   Total Marks: 70

Q:1   Select correct options in your answer book.   [10]

(1) A matrix whose determinant is not is not equal to zero, is called a _____.
    (a) singular   (b) non singular
    (c) Symmetric   (d) none of the above.

(2) A Square matrix A is said to be symmetric if.....
    (a) $A \neq A^T$ (b) $A = -A^T$ (c) $A = A^T$ (d) None of these

(3) $4(1, 2, 1) + 2(1, 3, 3) = $ ....
    (a) (6 , 14 , 10)   (b) (6 , 10 , 14)   (c) (6 , 4 , 10)   (d) (10 , 6 , 14)

(4) Norm of the vector u = (3, 0, 4) is _____.
    (a) 25   (b) 7   (c) 0   (d) 5

(5) A closed simple path is:
    (a) cycle   (b) trail   (c) open path   (d) none

(6) The degree of a pendant vertex is:
    (a) 0   (b) 1   (c) 2   (d) -1

(7) A spanning tree T of graph contains all the _____ of G.
    (a) edges   (b) regions   (c) colors   (d) vertices

(8) Chromatic number is the _____ number of color required to paint graph G.
    (a) total   (b) average   (c) minimum   (d) maximum

(9) Mode = 3(Median) – 2(_____)
    (a) mean   (b) Median   (c) Mode   (d) none of them

(10) Mode of 3, 7, 11, 9, 13, 1, 7, 12, 18, 6
    (a) 6   (b) 7   (c) 8.5   (d) none of these

Q:2   Answer the following in short. (Any Ten)   [12]

(1) Write difference between matrix and determinants.

(2) Define a skew symmetric matrix with example.

(3) If $A = \begin{bmatrix} 2 & 0 & -1 \\ 4 & 5 & 3 \\ 0 & 2 & 5 \end{bmatrix}$ then find $A + A^T$ and $A - A^T$.

(4) Find the degree of vertices V={P_1, P_2, P_3, P_4, P_5} where
E={(P_1, P_4),(P_1, P_2),(P_1, P_1),(P_3, P_4)}

(5) Define degree of vertex with example

(6) Define adjacent matrix.

(7) Define bridge and cut points.

(8) Define regular graph. Draw regular graphs of degrees 1 and 2.

(9) Draw all the spanning trees of the graph: $\bowtie$

(10) Define Mean.

(11) Define Qualitative data giving two examples.

(12) Obtain median of observations 30, 15, 26, 20, 24, 27, 39, 12 and 10.   (PTO)

Q:3 [6]

(a) If $A=\begin{bmatrix} 1 & -2 & 3 \\ 2 & 3 & -1 \\ -3 & 1 & 2 \end{bmatrix}$ and $B=\begin{bmatrix} 1 & 0 & 2 \\ 0 & 1 & 2 \\ 1 & 2 & 0 \end{bmatrix}$ Find the product of AB and BA show that AB ≠ BA.

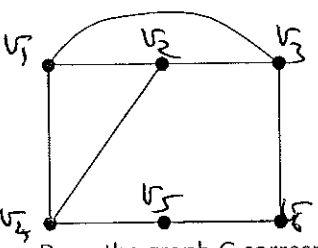**(b)** Using Cramer's rule solve the following simultaneous equations [4]
$3x - 2y = 5$, $5x + 4y = 1$.

OR

Q:3 Define the dot product and norm of vector. Let U=(5,4,1) , V=(3,−4,1) [6]
(c) (i) Find norm of U and V.　　(ii) Show that U and V are orthogonal.

(d) Let $A = \begin{bmatrix} 0 & 4 & 3 \\ 1 & -3 & -3 \\ -1 & 4 & 4 \end{bmatrix}$. Then prove that $A^2 = I$ [4]
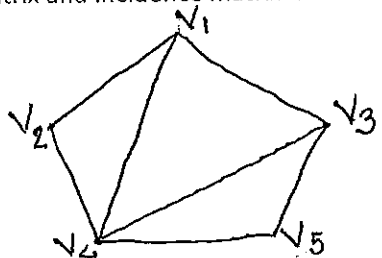
Q:4 Consider the graph G as [5]
(a)

(i) Find all simple paths from v_1 to v_6.
(ii) Find all trails from v_1 to v_6.
(iii) Find d (v_1 , v_5).
(iv) Find all cycles in G.

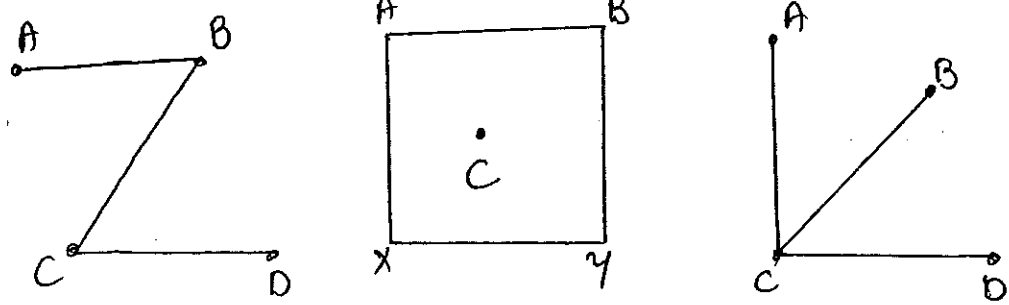**(b)** Draw the graph G corresponding to each adjacency matrix given below. [5]

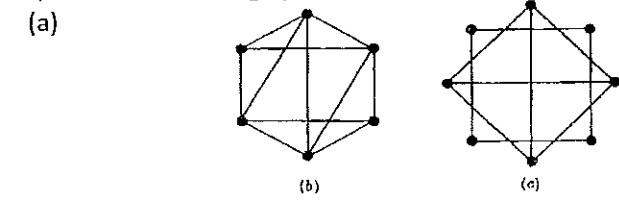$\begin{bmatrix} 1 & 1 & 2 & 0 \\ 1 & 2 & 1 & 3 \\ 2 & 1 & 2 & 0 \\ 0 & 3 & 1 & 0 \end{bmatrix}$

OR

Q:4 Find the Adjacent matrix and incidence matrix from the following graph. [5]
(c)

(d) Define connected graph. Determine whether or not each of the graphs is connected or not: [5]
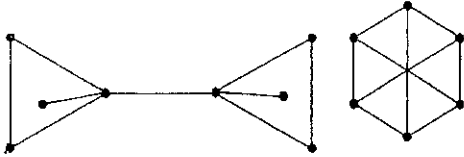

Q:5 Define: Planar graph. Checks which of the following are planar graphs. Justify. [5]
(a)

(b)　　　　　(c)

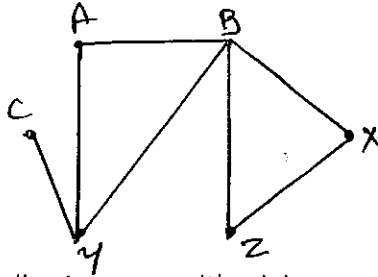(b) State Euler's formula. Verify it for the following graphs: [5]

OR

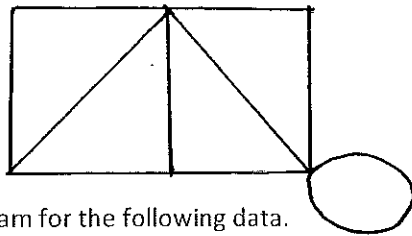Q:5 Find cut point and Bridge from the following graph. [5]
(c)

(d) Paint the following maps with minimum number of colors: [5]

Q:6 Obtain histogram for the following data. [5]
(a)

x_i	4 - 8	8 - 16	16 - 20	20 - 32	32 - 40
f_i	6	24	10	27	18

(b) Calculate median, mode. [5]

Class	160-165	165-170	170-175	175-180	180-185	185-190
frequency	8	12	14	7	6	3

OR

Q:6 Obtain histogram and frequency polygon for the following data. [5]
(c)

Class	10-20	20-30	30-40	40-50	50-60	60-70
frequency	3	9	15	17	8	3

(d) Calculate mean, median. [5]

Class	0-100	100-200	200-300	300-400	400-500
frequency	40	89	148	64	39

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