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SARDAR PATEL UNIVERSITY

M.SC.(IT) SEM-I (NC) EXAMINATION

2015

SATURDAY, 18TH APRIL

10:30 AM TO 12:30 PM

PS01FIIT02: **MATHEMATICS-I**   **Total Marks: 70**

Q:1 Choose the correct option in the following, mention the correct option with the answers in the answer book.   [10]

(1) Chromatic number is the _____ number of color required to paint graph G.

    (a) total   (b) average   (c) minimum   (d) maximum

(2) An alternating sequence of vertices and edges in graph is called:

    (a) trail   (b) cycle   (c) path   (d) degree

(3) $2(1, -2, 1) + 2(1, 3, -3) =$ ....

    (a) (1 , 2 , -4)   (b) (4 , -2 , -4)   (c) (4 , 2 , -4)   (d) (4 , 2 , 4)

(4) Norm of the vector $u = (-1, 2, -2)$ is

    (a) 9   (b) 3   (c) 1   (d) -9

(5) The degree of an isolated vertex is:

    (a) 0   (b) 1   (c) 2   (d) -1

(6) In a connected map with R =10, V = 25 then E = _____

    (a) 24   (b) 30   (c) 33   (d) 38

(7) Mode of 2, 3, 7, 6, 9, 6, 4, 8 is

    (a) 7   (b) 6   (c) 4   (d) 9

(8) Geometric mean of x, y, z is given by

    (a) $\sqrt{xyz}$ (b) $\sqrt{x + y + z}$ (c) $\sqrt[3]{xyz}$ (d) none of these

(9) The degree of each vertex of the complete graph K_8 is :

    (a) 49   (b) -7   (c) 7   (d) 1

(10) 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

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

(1) 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)}

(2) Define the terms: Map and Regions.

(3) Define: Planar graph. Is below graph is planar?
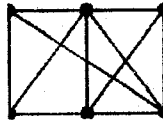
(4) If $A = \begin{bmatrix} 2 & 0 & -1 \\ 4 & 5 & 3 \\ 0 & 2 & 5 \end{bmatrix}$ then find $A + A^T$ and $A - A^T$.

(5) Define graph and multigraph.

(6) Explain quantitative data.

(7) Define arithmetic mean.

(8) Find x, y, z if (2x, 3, y) = (4, x + z, 2z).

(9) Define bridge and cut points.

(10) Define tree and spanning trees of the graph.

(11) Define: Incidence matrix.

(12) Obtain median of the data 2, 5, 6, 2, 4, 5, 8 and 6.

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

(b) Let $A = \begin{bmatrix} 1 & 3 \\ 5 & 3 \end{bmatrix}$. Find f (A), where f(x) = x^2 – 4x -12. **[5]**

OR

Q:3 (c) If $A = \begin{bmatrix} 2 & 4 \\ 3 & 0 \\ 3 & 2 \end{bmatrix}, B = \begin{bmatrix} 4 & 2 & 3 \\ 7 & 1 & 5 \end{bmatrix}$ then prove that $(AB)^T = B^T A^T$ **[5]**
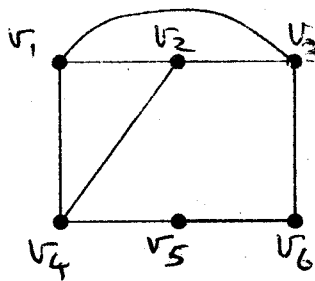
(d) Using Cremer's rule solve the simultaneous equations 3x – 2y = 5, 5x +4y =1.

Q:4 (a) Draw the graph G corresponding to each adjacency matrix given below. **[5]**

$$\begin{bmatrix} 1 & 3 & 0 & 0 \\ 3 & 0 & 1 & 1 \\ 0 & 1 & 2 & 2 \\ 0 & 1 & 2 & 0 \end{bmatrix}$$
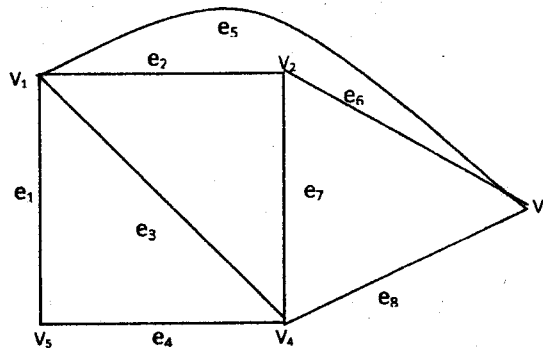
(b) Consider the graph G as [5]

(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.

OR

Q:4 Find the incidence matrix and adjacency matrix for the following Graphs: [5]
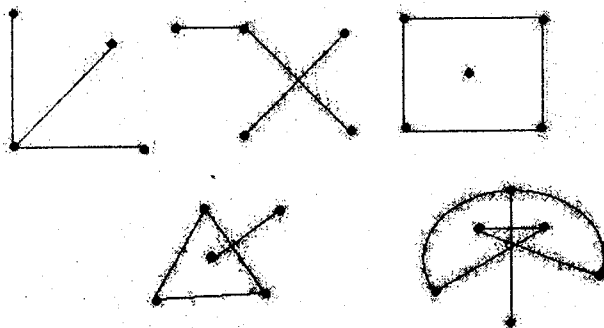(c)

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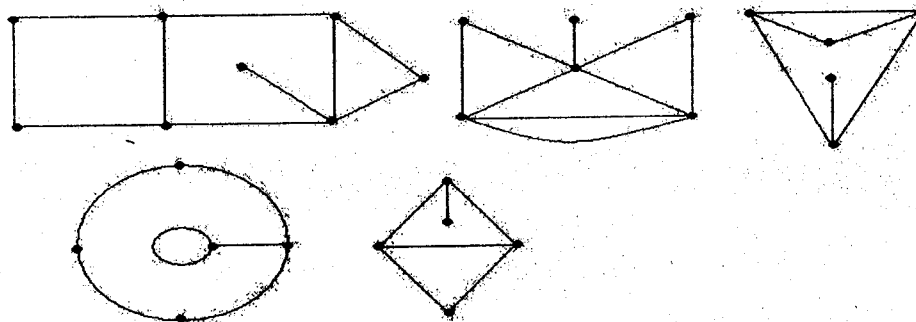Define connected graph. Determine whether or not each of the graphs is connected or not:
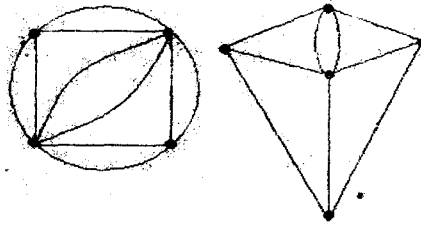

Q:5 [5]
(a) Identify cycle or closed path that borders each region of the following map. Also find the degree of each region and chromatic number of the following maps:

[5]

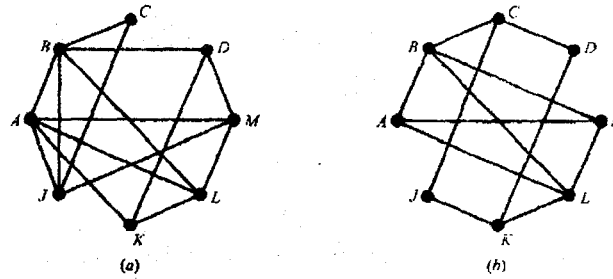(b) Define the coloring of a map. Paint the following maps with minimum number of colors:

OR

Q:5 **[5]**

(c) Find chromatic number for the following graphs using Welch-Powell algorithm:

(a)　　　　　(h)

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

Q:5 Calculate Mean, Median and Mode for the following data. **[10]**

weight(lbs) X	130	135	140	145	146	148	149	150	157
no. of persons(f)	3	4	6	6	3	5	2	1	1

OR

Q:6 The marks of 40 students who attended a workshop competitive exam are as follows: **[10]**

27	32	57	34	36	48	49	31	51	34
49	45	51	29	47	36	50	46	30	46
35	35	48	41	53	36	37	47	47	30
43	45	42	30	46	50	28	44	48	49

[i] Classify the above data in exclusive classes & one of them being 40 – 44.

[ii] Obtain mean and median of the distribution.

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