SARDAR PATEL UNIVERSITY
BCA (II Semester) Examination
Monday, 16 March 2015
2.30 - 5.30 pm
US02FBCA02 - Mathematics II

Max Marks: 70

Q:1   Attempt Following.   **[10]**

1] Edges connecting the same end points are called _____
  a) trivial graph   c) multigraph
  b) null graph   d) multiple edges

2] The chromatic number of graph K_{120} is $\aleph(K_{120}) =$ _____
  a) 60   c) 120
  b) 30   d) 40

3] In a coloring of a map M, one required to color the _____
  a) edges   c) vertices
  b) regions   d) none of these

4] An alternating sequence of vertices and edges in graph is called _____
  a) trail   c) path
  b) degree   d) cycle

5] The degree of isolated vertex is _____
  a) not possible   c) zero
  b) one   d) two

6] The sum of the degrees of the vertices of a graph is _____ the number of edges.
  a) greater than   c) less than
  b) equal to twice   d) equal to

7] $\binom{12}{10} =$ _____
  a) 12   c) 10
  b) 120   d) 66

8] The relation between correlation coefficient and regression coefficients is _____
  a) $r = \pm\sqrt{b_{XY} + b_{YX}}$ c) $r = \dfrac{b_{XY} + b_{YX}}{2}$

  b) $r = \pm\sqrt{b_{XY} b_{YX}}$ d) None of these

9] A square of .... is called Variance.
  a) Range   c) Quartile deviation
  b) Mean deviation   d) Standard deviation
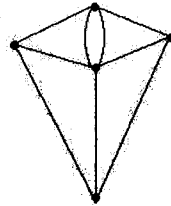
10] If $r < n$, then $P(n, r) =$ _____

a) $n!$

b) $(n - r)!$
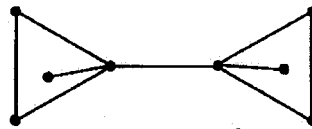
c) $\dfrac{n!}{(n - r)!}$
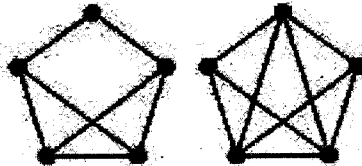
d) $\dfrac{n!}{r!}$

Q:2 Attempt Any Ten. [20]

1) Paint the following map with minimum number of colors:

2) Define range and quartile deviation.
3) Draw a diagram of complete graph K_5 and K_6.
4) Define cut point and parity of a vertex.
5) Verify Euler's formula for the following graph:

6) Describe formally the multigraphs shown below(Give names to vertices as well as edges):

7) A farmer buys three cows, two pigs and four hens from a man who has six cows, five pigs and eight hens. How many choices does the farmer have?
8) If the quartiles $Q_1 = 62, Q_2 = 142$ and $Q_3 = 195$, then find the Bowley's coefficient of skewness.
9) Find the number of distinct permutation that can be formed from all the letters of the word
   (1) RADAR (2) UNUSUAL

10) Draw all possible spanning trees for the following graph:
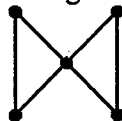
11) Find the number of ways that a party of seven persons can arrange themselves around a circular table.

12) The coefficient of correlation between two variables X and Y is 0.48, the covariance is 36 and the variance of X is 16, then find the standard deviation of Y.

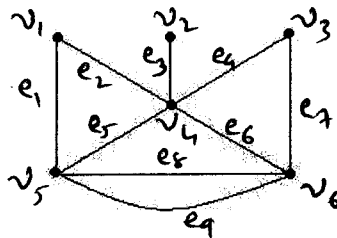**Q:3 [A]** Find bridges and cut points for the following graph. **[03]**
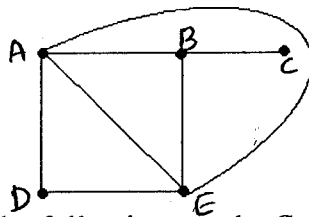
[B] Draw a diagram for each of the following graphs G=G(V,E): **[03]**

(a) V={a,b,c,d,e,f}, E=[{a,b},{a,c},{b,c},{d,e}]

(b) V={ P1,P2,P3,P4,P5},
E=[{P1,P1},{P2,P3},{P2,P4},{P3,P2},{P4,P1},{P5,P4}]

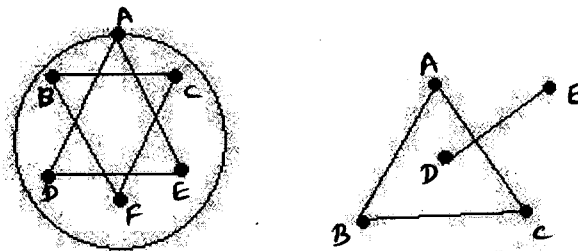**[C]** Find the incidence matrix and adjacency matrix for the following graph: **[04]**

OR

Q:3 [A] Define the following terms: **[03]**
1) Diameter of a graph   2) Regular graph   3) Simple path

**[B]** Find the connected components of the following graphs: **[03]**

[C] Draw the graph G corresponding to each adjacency matrix given below. **[04]**

(1) $A = \begin{bmatrix} 0 & 1 & 1 & 1 & 0 \\ 1 & 0 & 0 & 1 & 0 \\ 1 & 0 & 0 & 1 & 1 \\ 1 & 1 & 1 & 0 & 1 \\ 0 & 0 & 1 & 1 & 0 \end{bmatrix}$

(2) $A = \begin{bmatrix} 1 & 1 & 2 & 0 \\ 1 & 2 & 1 & 3 \\ 2 & 1 & 0 & 1 \\ 0 & 3 & 1 & 0 \end{bmatrix}$

Q:4 Define the terms: planar graph, chromatic number. Determine the chromatic number of each of the following graphs using Welch Powell algorithm: **[10]**
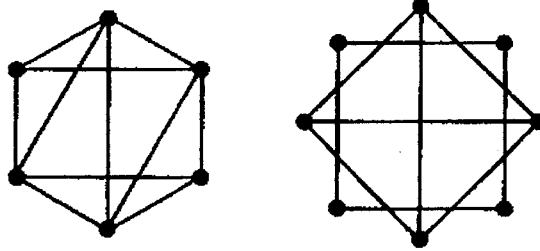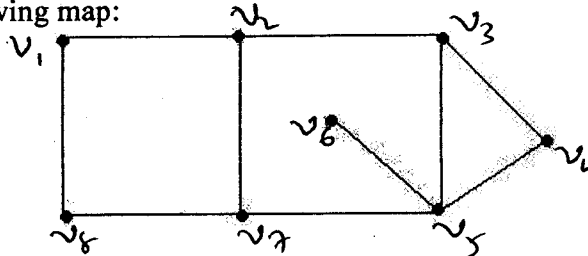

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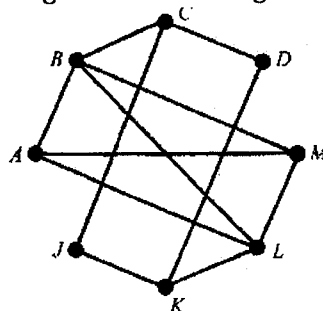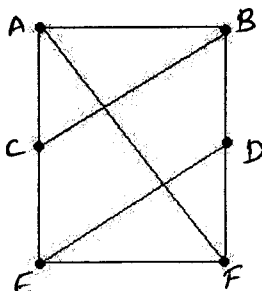
Q:4 Answer the following: **[10]**

a) Define non-planar graph. Check whether the following graphs are planar or not (with justification)

b) State Euler's formula. 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 map:

Q:5[A] Find n, if (i) $2P(n, 2) + 50 = P(2n, 2)$ (ii) $P(n, 4) = 42 P(n, 2)$. **[06]**

[B] Find the number of distinct permutation that can be formed from all the letters of the word MISSISSIPPI. Also find the number of distinct permutation if the words are to begin with I **[04]**

OR

Q:5[A] Suppose repetitions are not permitted. (a) Find the three-digit numbers that can be formed from the six digits 2, 3, 5, 6, 7, and 9. (b) How many of them are less than 400? (c) How many of them are even? **[06]**

[B] Simplify: (1) $\dfrac{(n-r+1)!}{(n-r-1)!}$ (2) $\dfrac{(n-1)!}{(n+2)!}$ **[04]**

Q:6[A] Find the standard deviation for the following frequency distribution and obtain the coefficient of variance. **[06]**

x:	6	7	8	9	10	11	12
f:	3	6	9	13	8	5	4

[04]

[B] Given $\sum X = 125$, $\sum Y = 100$, $\sum X^2 = 650$, $\sum Y^2 = 436$, $\sum XY = 520$ and $n = 25$ Obtain the value of Karl Pearson's coefficient of correlation **r**.

OR

Q:6[A] Calculate Karl Pearson's coefficient of correlation between x and y from the following data: **[06]**

X:	10	6	9	10	12	13	11	9
Y:	9	4	6	9	11	13	8	4

[B] Find regression equations x on y from the following data. **[04]**

X:	10	6	9	10	12	13	11	9
Y:	9	4	6	9	11	13	8	4

—✕—