SARDAR PATEL UNIVERSITY

BCA Sem-II (NC) EXAMINATION

2016

MONDAY, 17th OCTOBER

02.00 pm to 05.00 pm

SUBJECT: MATHEMATICS-II (US02FBCA02)

Maximum Marks: 70

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

(1) If restaurant has 6 different desserts, then customer can choose 2 of the desserts in ...... ways

    (a) 6   (b) 4   (c) 12   (d) 15

(2) A graph G is ____ if each vertex has the same degree.

    (a) disconnected   (b) regular   (c) complete   (d) connected

(3) If the regression coefficient $b_{XY} > 1$, then

    (a) $b_{YX} = 0$ (b) $b_{YX} > 0$ (c) $b_{YX} < 1$ (d) None of these

(4) Which of the following is not the measure of Dispersion

    (a) Range   (b) Standard deviation   (c) Mode   (d) Mean deviation

(5) Edges connecting the same end points are called

    (a) trivial graph   (b) multigraph   (c) loops   (d) multiple edges

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

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

(7) If the Karl-Pearson's correlation coefficient r = 1, then the correlation is

    (a) Zero correlation   (b) Perfect Positive

    (c) Perfect Negative   (d) Partial Positive

(8) The number of edges in the complete graph K_{12} is

    (a) 66   (b) 24   (c) 144   (d) 12

(9) In a coloring of a map M, one required to color the ....

    (a) edges   (b) vertices   (c) regions   (d) none of these.

(10) $\binom{n}{0} + \binom{n}{n} =$

    (a) n   (b) 1   (c) 2   (d) 3

        (PTO)

**Q:2** Answer the following in short (**Attempt any Ten**). [20]

(1) Draw a connected map of a graph with 4 vertices and 5 regions.

(2) Draw 3-regular graph with 6-vertices.

(3) Find cut-vertices and bridges of a graph K_5 and $K_{2,2}$.

(4) Explain the positive correlation with two examples.

(5) Draw all the different spanning trees of a graph:

(6) Define range and quartile deviation.

(7) State Euler's formula with at least two examples which verifies it.

(8) Find the number of ways that a party of seven persons can arrange themselves around a circular table.

(9) Define complete graph. Is K_5 Complete?

(10) Find the number n of distinct permutations that can be formed from all the letters of each words SURGICAL and STRIKE.

(11) Find standard deviation of the observation 1, 2, 3, 4, 5, 6, 7, 8

(12) A class contains 10 students with 6 men and 4 women. Find the number n of ways to select a 4-member committee with 2 men and 2 women.

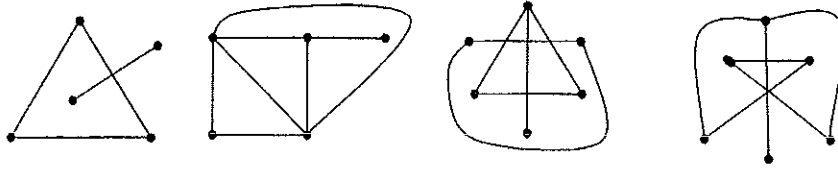**Q:3(a)** Find the incidence matrix and adjacency matrix for the following graph [5]
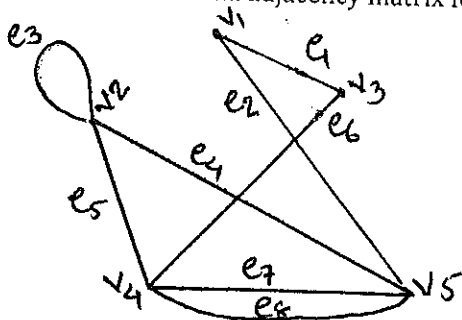
(b) Draw a multigraph whose adjancey matrix is $A = \begin{bmatrix} 0 & 1 & 2 & 0 \\ 1 & 1 & 1 & 1 \\ 2 & 1 & 0 & 1 \\ 0 & 3 & 1 & 0 \end{bmatrix}$ [5]
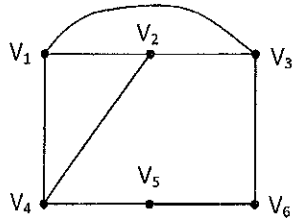
OR

(2)

**Q:3(c)** Define connected graph. Which of the following graphs are Connected? [5]
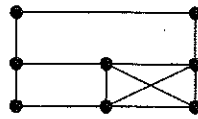

(d) Consider the graph G as [5]

(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.

Q:4(a) Describe Welch-Powell algorithm for painting a graph and give one example of it. [5]

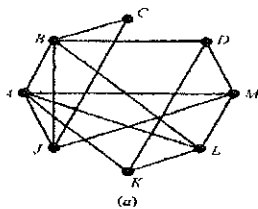**(b)** State Euler's formula for planar graph. Verify Euler's formula for the following graphs: [5]
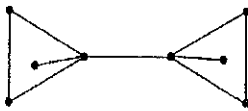
(i)   (ii)

OR

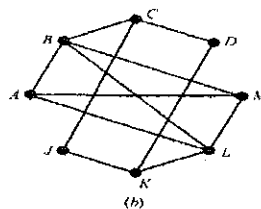**Q:4(c)** Find chromatic number for the following graphs using Welch-Powell algorithm: [5]
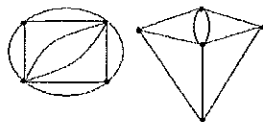

(a)   (b)

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

Q:5(a) Find the number of ways that four mathematics books, three history books, three chemistry books and two sociology books can be arranged on a shelf so that all books of the same subject are together. [5]

(b) A debating team consists of 3 boys and 3 girls. Find the number of ways they can   [5]
     sit in a row where :(a) there are no restrictions; (b) the boys and girls are each to
     sit together; (c) just the girls are to sit together.

<div align="center">OR</div>

Q:5(c) Find the number m of five letter "words" containing two different vowels and   [5]
        three different consonants that can be formed from the 26 alphabets. Also find m
        if the words must begin with B.

(d) Simplify: (1) $\dfrac{(n-r+1)!}{(n-r-1)!}$ (2) $\dfrac{(n-1)!}{(n+2)!}$ [5]

Q:6(a) Find quartile deviation for the following data   [5]

Class	0-15	15-30	30-45	45-60	60-75	75-90	90-105
f	8	26	30	45	20	17	4

(b) Calculate Karl Pearson's coefficient of correlation between x and y from the   [5]
     following data:

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

<div align="center">OR</div>

Q:6(c) Calculate the Standard Deviation the following table giving the age distribution of   [5]
        542 members.

Age in year	20-30	30-40	40-50	50-60	60-70	70-80	80-90
No. of Members	3	61	132	153	140	51	2

(d) For following data find mean and mode for the following marks distribution.   [5]

Marks	10-20	20-30	30-40	40-50	50-60	60-70
No. of students	10	18	27	20	15	6

<div align="center">(4)</div>

<div align="center">(4)</div>