

I.M.C.A. SEM-V (2014 COURSE) CBCS : SUMMER - 2018

SUBJECT: COMBINOTRICS & GRAPH THEORY

Day: Friday
Date: 04/05/2018

S-2018-1767

Time: 02.00 PM TO 05.00 PM
Max. Marks: 100

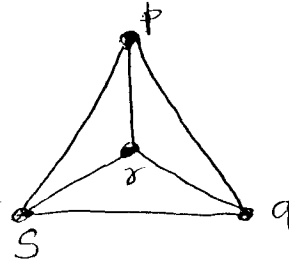
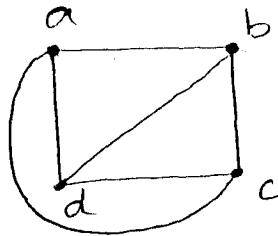
N.B.:

- 1) Attempt ANY FOUR from Section-I & ANY TWO from Section-II.
- 2) Use of non programmable scientific CALCULATOR is allowed.

SECTION - I

- Q.1 Three cards are drawn from a well shuffled pack of 52 playing cards. [15]
Find
i) the number of ways of drawing all the three cards as number cards.
ii) the number of ways of drawing 2 heart cards and 1 an ace card.
iii) the probability of getting all the three cards as picture cards.

- Q.2 State whether the following graphs are isomorphic with explanation. [15]



- Q.3 Two friends A and B appeared for an interview independently. Their chances of getting selection for the jobs are $\frac{3}{5}$ and $\frac{1}{5}$ respectively. Find the probability that [15]
i) both friends A and B are selected.
ii) only one of them is selected.
iii) none of them is selected.

- Q.4 Two numbers from 1 to 3 are chosen at random with repetition allowed. If X denotes the sum of the numbers, then [15]
i) find the distribution of X.
ii) find the expectation of X.

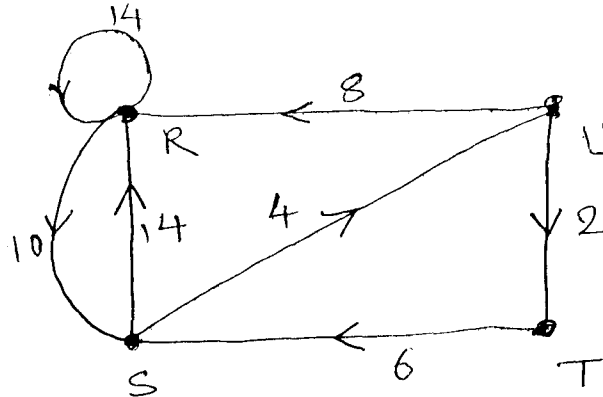
- Q.5 Explain Hamiltonian and Eulerian graphs. Draw a graph [15]
a) which is Hamiltonian but non Eulerian .
b) which is Eulerian but non Hamiltonian.

- Q.6 Write short notes on: [15]
a) Sheep cabbage problem and its analysis by using graph.
b) Colouring of graphs .
c) Probability density function of continuous random variable.

P.T.O.

SECTION - II

- Q.7** Write Warshall's algorithm to find the shortest path. Apply it to find the shortest path from T to R from the following graph. [20]



- Q.8 a)** An author has 4 typists typing the manuscript of his latest book. Typist A does 30% of typing, typist B does 25% of typing, typist C does 20% of typing and typist D does remaining typing work. Error occur on 5% of the pages typed by A, on 4% typed by B, on 3% typed by C and 2% typed by D. [10]

A page is chosen at random and found to contain errors. What is the probability that it was typed by typist A?

- b)** Write a note on Cumulative Probability Function with suitable example. [10]

- Q.9 a)** Explain the following graphs with neat diagram [10]

- i) Multigraphs
- ii) Isomorphic graphs
- iii) Complete graphs
- iv) Planer graphs
- v) Homographic graphs

- b)** There are 4 professors, 3 clerks and 6 students for forming a committee of 5 people. In how many ways can the committee be formed so that [10]

- i) there are at least 3 professors in the committee?
- ii) there are at most 2 clerks in the committee.

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