

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

SUBJECT: COMBINOTRICS & GRAPH THEORY

Day: **Friday**
Date: **04/05/2018**

S-2018-1713

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

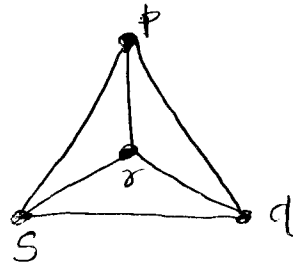
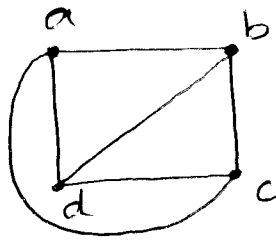
N.B.:

- 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.

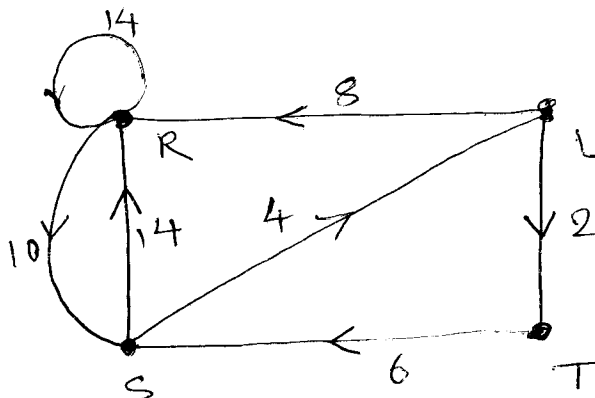
- Q.5** Explain Hamiltonian and Eulerian graphs. Draw a graph [15]
a) which is Hamiltonian but non Eulerian .
b) which is Eulerian but non Hamiltonian.

- 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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