I.M.C.A. SEM–V (2014 Course) CBCS : SUMMER - 2019

SUBJECT : COMBINATORICS & GRAPH THEROY

Day : Wednesday
Date : 24/04/2019

S-2019-2132

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

N.B.:

1) Attempt **ANY FOUR** questions from Section – I. Each question carries **15** marks.
2) Attempt **ANY TWO** questions from Section – II. Each question carries **20** marks.
3) Answers to both the sections should be written in SAME answer books.

SECTION – I

Q.1 Three cards are drawn from a well shuffled pack of 52 playing cards. What is the probability that:

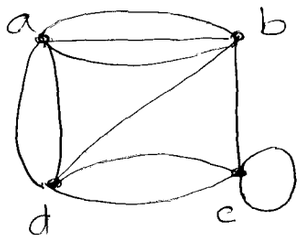
i) all the three cards drawn are red cards?
ii) all the three cards drawn bear number?
iii) all the three cards drawn belong to same suit?

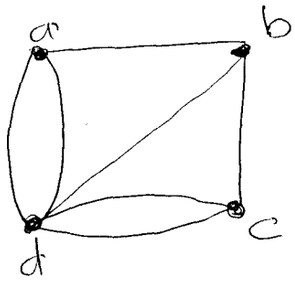
Q.2 How many permutations of the letter ABCDEFG contain

i) the string BCD?
ii) the string BA and GF?
iii) the strings CBA and BED?

Q.3 Represent the following graphs by using :

i) adjacency matrix **ii)** adjacency list





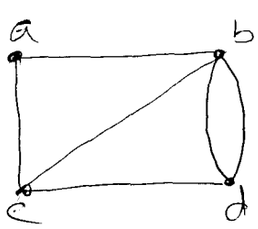
Q.4 Following table shows p.d.f. of discrete random variable X. Find:

i) E(X) **ii)** V(X) **iii)** Standard Deviation.

X = x	1	2	3	4	5	6
P (X = x)	0.14	0.18	0.24	0.20	0.18	0.08

Q.5 Explain : **i)** Utilities problem **ii)** Traveling salesman problem.

Q.6 Check whether the following graphs are isomorphic :



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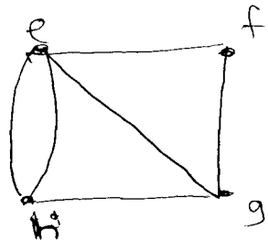

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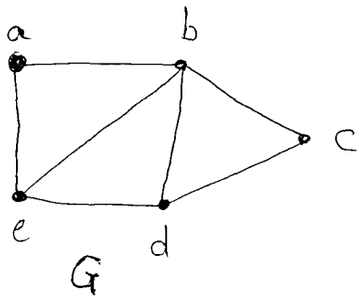
P.T.O.

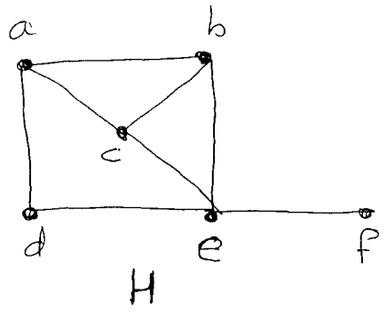
Q.7 Write short notes on **ANY THREE** of the following:

a) Binomial distribution
b) Planer graphs
c) Types of graphs
d) Coloring of graphs
e) Sheep cabbage problem

SECTION – II

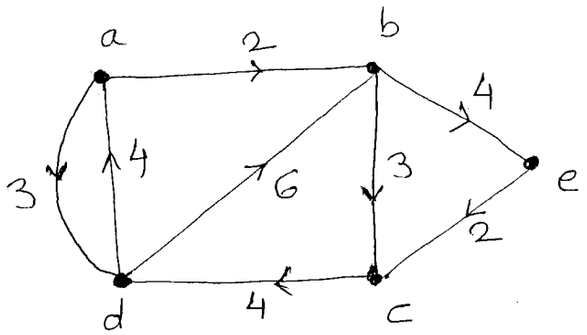
Q.8 **a)** Determine whether the following graphs have:
i) Hamilton circuit **ii)** Hamilton path





b) Explain : **i)** Complete graphs **ii)** Pigeonhole principle

Q.9 Explain Warshall's algorithm. Use Warshall's algorithm to find the shortest path from each vertex to each of the other vertex from the following graph:



Q.10 **a)** A product is manufactured on three machines A, B and C. 30% of total products are manufactured on machine A, 35% of total products are manufactured on Machine B and remaining products are manufactured on machine C. The probabilities that the manufactured product is defective on these machines are 2% , 3 % and 5 % respectively. A manufactured product is selected at random from the lot and is found to be defective. What is the probability that,
i) the product is manufactured on machine A?
ii) the product is manufactured on machine C?

b) When three fair coins are tossed simultaneously, what is the probability that
i) all three coins show same result?
ii) at least two coins show head?

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