

B.C.A. SEM-V (2014 COURSE) CBCS : WINTER - 2017

SUBJECT : COMBINOTRICS & GRAPH THEORY

Day : **Thursday** Time : **02.00 PM TO 05.00 PM**
Date : **16/11/2017** **W-2017-1621** Max. Marks : 100

N.B.:

- 1) Attempt **ANY FOUR** questions from Section – I and **ANY TWO** questions from Section – II.
- 2) Answers to both the sections should be written in **SEPARATE** answer books.
- 3) Figures to the right indicate **FULL** marks.

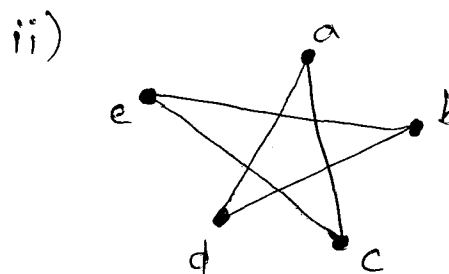
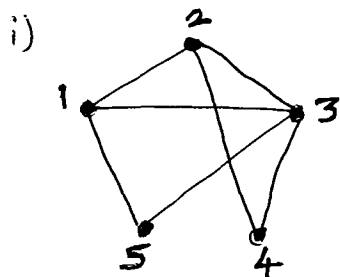
SECTION – I

- Q.1** a) Explain pigeonhole principle with two examples [07]
b) Find the probability of getting 2 king cards and 1 ace card when three cards are drawn from a well shuffled pack of 52 playing cards [08]

- Q.2** a) Find $E(X)$ and $Var(X)$ from the following probability distribution : [07]

x_i	1	2	3	4	5	6
$p(x_i)$	$\frac{1}{36}$	$\frac{9}{36}$	$\frac{13}{36}$	$\frac{6}{36}$	$\frac{5}{36}$	$\frac{2}{36}$

- b) Represent the following graphs by using adjacency matrix. [08]



- Q 3** a) There are 5 girls and 4 boys who wish to take a photograph. In how many ways can they sit for a photograph in such a way that [07]
i) all girls always sit together?
ii) three boys are always together?

- b) Explain sheep cabbage problem in detail. [08]

- Q.4** a) Find the values of : [07]
i) 8C_4 ii) 9C_3 iii) 5P_4 iv) 4P_0 .

- b) Explain depth first search algorithm. [08]

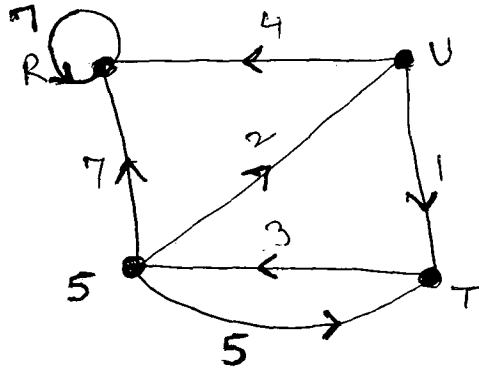
- Q 5** Write short notes on **ANY THREE** of the following: [15]

- a) Cumulative probability distribution function
- b) Colouring of graphs
- c) Complete and planer graphs
- d) Bridges of Konigsberg problem

P.T.O.

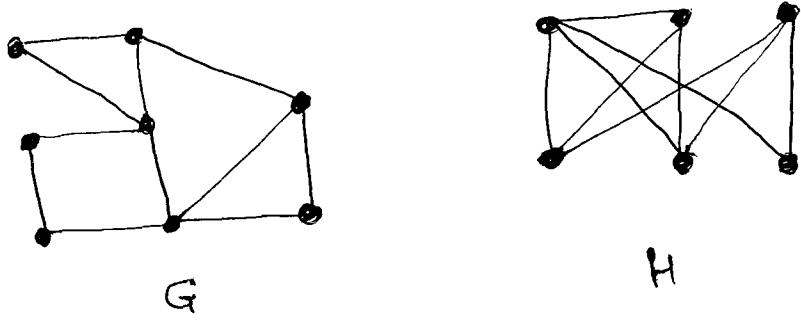
SECTION – II

Q.6 Explain Warshall's algorithm. From the given graph, find the shortest path from each vertex to each other vertex by using Warshall's algorithm. [20]



Q.7 a) Find n if: [10]
 i) $P(n, 4) = 42 P(n, 2)$.
 ii) $C(n, 12) = C(n, 8)$.

b) Which of the following G and H graphs have: [10]
 i) Eulerian path?
 ii) Hamilton circuit?



Q.8 a) Find $E(X)$, $Var(X)$ and standard deviation from the following distribution: [10]

x_i	2	6	8	12	15
P_i	0.1	0.4	0.1	0.2	0.2

b) State and prove Bayes theorem. [10]

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