

**M.C.A. SEM - II (CHOICE BASED CREDIT SYSTEM 2011 &
2012 COURSE) : WINTER - 2017**
SUBJECT : DISCRETE STRUCTURES - II

Day : **Thursday**
Date : **16/11/2017**

Time : **10.00 AM TO 01.00 PM**
Max. Marks : 100

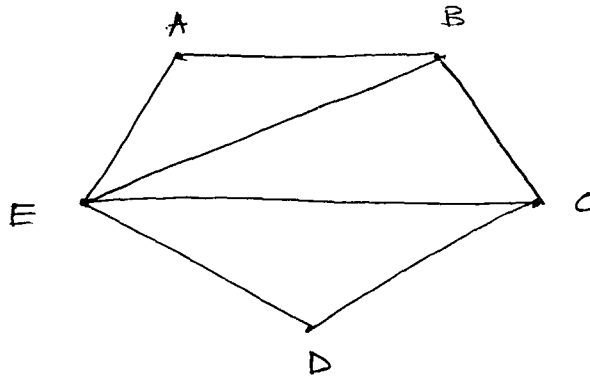
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N.B.:

- 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)** Define Euler graph. Check whether given graph is Euler or not. **[07]**



- b)** Find solution to the recurrence relation. **[08]**

$$a_n = 6a_{n-1} - 11a_{n-2} + 6a_{n-3}$$

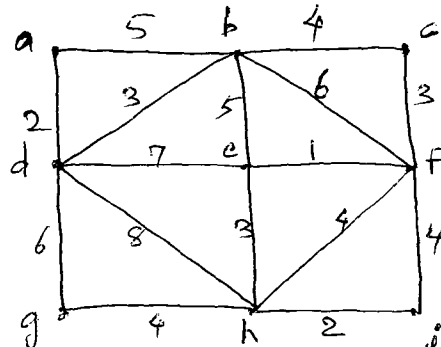
- Q.2 a)** A multiple choice test contains 10 questions. There are four possible answers for each question. **[10]**
- i) How many ways can a student answer the questions on the test if the student answers every question?
 - ii) How many ways can a student answer the questions on the test if the student can leave answers blank?

- b)** Draw a 3 regular graph with eight vertices. **[05]**

- Q.3 a)** State and prove Handshaking Theorem **[07]**

- b)** Find adjacency matrix for each of these graphs. **[08]**
- i) $K_{4,3}$ ii) C_6 iii) W_5 iv) Q_3

- Q.4 a)** Explain prim's algorithm to find a minimum spanning tree for given weighted graph. **[08]**



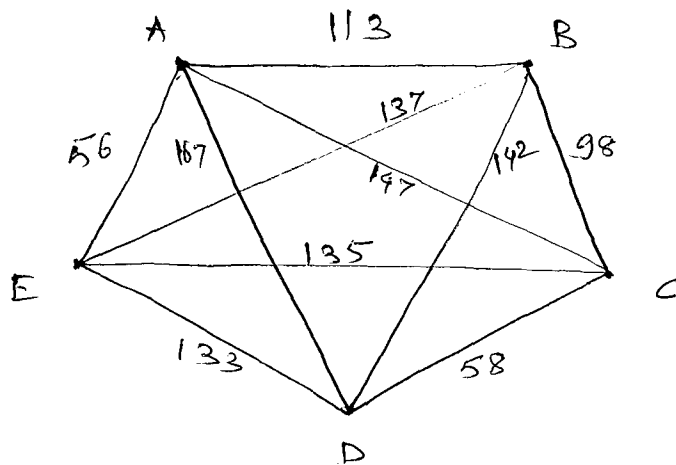
- b)** Illustrate inorder and preorder traversing in a tree. **[07]**

[07]
P.T.O.

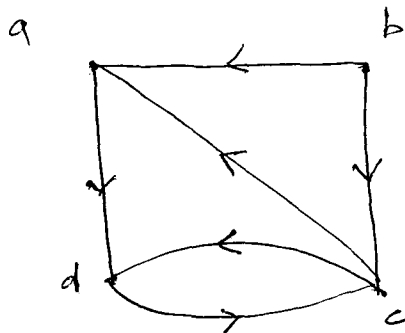
- Q.5 a) Suppose that a connected planar simple graph has 20 vertices, each of degree 3. In how many regions does a representing graph split the plane? [08]
- b) In a discrete mathematics class every student is a major in computer science or mathematics or both. The number of students having computer science as a major is 25, the number of students having mathematics major is 13. The number of students majoring in both mathematics and computer science is 8. How many students are in this class? [07]
- Q.6 a) Compare and construct depth first search and breadth first search methods. [08]
- b) Write note on matching of graph. [07]

SECTION – II

- Q.7 The road map between 5 different cities is shown with given weighted graph where weights represent distance in km between two cities. Suppose a delivery boy of courier service company wants to visit all the cities covering minimum distance. In which order should he visit these cities? [20]



- Q.8 Explain Huffman coding. Use this algorithm to encode the following symbols with the frequencies listed A : 0.08, B : 0.10, C : 0.12, D : 0.15, E : 0.20, F : 0.35. What is the average number of bits used for encoding? [20]
- Q.9 State Warshall's algorithm. Use it to define connectivity in given directed graph. [20]



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