## M.C.A. SEM - II (CHOICE BASED CREDIT SYSTEM 2011 & 2012 COURSE ) : SUMMER - 2018
## SUBJECT : DISCRETE STRUCTURES - II

| | | | |
|---|---|---|---|
| Day | : | **Friday** | Time : **10.00 AM TO 01.00 PM** |
| Date | : | **04/05/2018** **S-2018-1790** | 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)** Define the terms: [08]
  i) Planar graph     iii) Binary search tree
  ii) Complete graph     iv) Bipartite graph

    **b)** A bowl contains 10 red balls and 10 blue balls. A woman selects balls at [07] random without looking at them.
  i) How many balls must she select to be sure of having at least three balls of the same colour?
  ii) How many balls must she select to be sure of having at least three blue balls?

**Q.2** **a)** State and prove Pascal's identity and Triangle. [07]

    **b)** A planar graph with v vertices, e edges divide the plane in r regions then prove [08] that $r = e - v + 2$.

**Q.3** **a)** Prove that a tree with n vertices has $(n - 1)$ edges. [08]

    **b)** Determine whether the sequence $\{a_n\}$ where $a_n = 3n$ for every non negative [07] integer n, is a solution of the recurrence relation $a_n = a_{n-1} - a_{n-2}$ for $n = 2, 3, 4$.

**Q.4** **a)** Construct a binary search tree to represent following data elements: [10]
       40, 25, 36, 62, 58, 75, 15, 30, 70, 60.

    **b)** What s chromatic number? Find chromatic number for $K_4$, $C_6$, $K_{5,5}$, $W_5$, $Q_3$. [05]

**Q.5** **a)** Represent an arithmetic equation $3*2 \uparrow 2 - (5 - 3) * (8 / 4)$ in binary tree and [10] convert it into prefix and postfix notation using appropriate tree operation.

    **b)** Define Hamilton graph and Hamilton circuit with example. [05]

**Q.6** Write note on **ANY TWO** of the following: [15]

    **a)** Huffman coding

    **b)** Traveling salesman problem

    **c)** Matching of graph
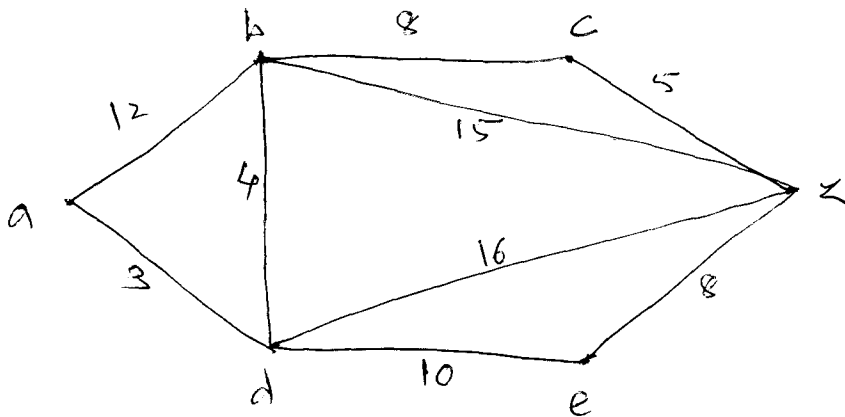
**P.T.O.**

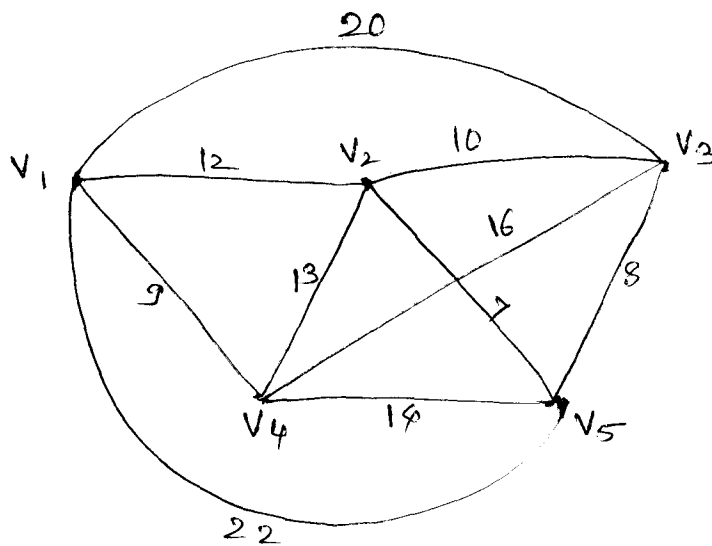**SECTION – II**

**Q.7**   What is isomorphic graphs?  Check whether given graphs are isomorphic or not?   **[20]**
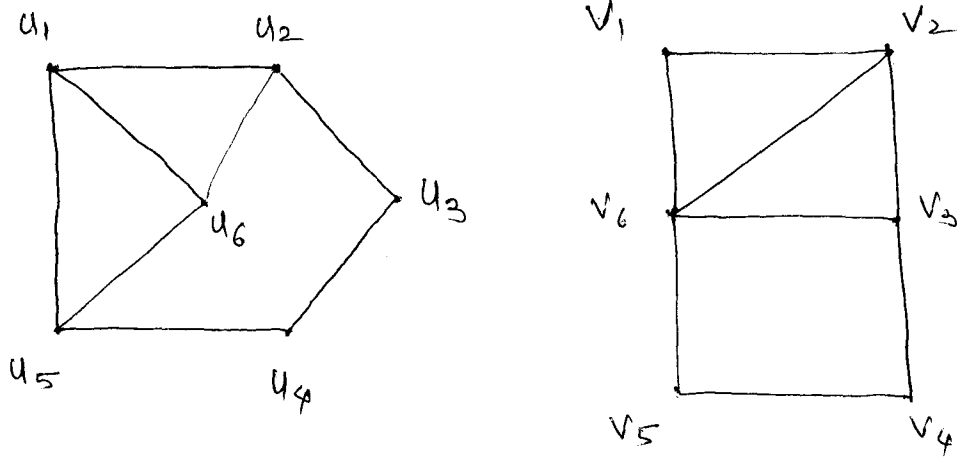


**Q.8**   Explain Dijkstra's algorithm to find shortest path.  Trace it to find path between a to z in given graph.   **[20]**



**Q.9**   Write Kruskal's algorithm to find minimum spanning tree in given graph.   **[20]**



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