

Subject : Mathematical Foundations

Day : Friday
Date : 10/06/2016



Time : 10.00 A.M. TO 1.00 P.M.
Max Marks : 80 Total Pages : 2

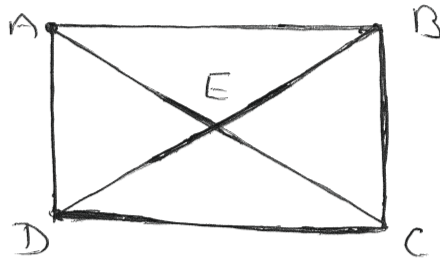
N.B.:

- 1) Attempt any **FIVE** questions from Section-I and any **TWO** questions from Section-II.
- 2) Both the sections should be written in the **SAME** answer book.
- 3) Figures to the **RIGHT** indicate full marks.

SECTION-I

- Q.1 a)** Determine the validity of the following argument. **(05)**
If 7 is less than 4, then 7 is not a prime number.
7 is not less than 4

7 is a prime number
- b)** Construct the Truth Table for the following statement. **(05)**
 $[p \rightarrow (q \rightarrow r)] \rightarrow [(p \rightarrow q) \rightarrow (q \rightarrow r)]$.
- Q.2 a)** Prove by induction method, for natural number n **(05)**
 $1 + 4 + 7 + \dots + (3n - 2) = 2n(3n - 1)$
- b)** Prove that $|A \cup B| = |A| + |B| - |A \cap B|$. **(05)**
- Q.3 a)** Let $f : \mathbb{R} \rightarrow \mathbb{R}$ be defined by $f(x) = (x/2) - 3$. Prove that f is a bijective function. **(05)**
- b)** Write an algorithm to find all the elements of power set of the given set. **(05)**
- Q.4** What is graph coloring? Obtain the chromatic polynomial for the following graph. **(10)**



- Q.5** Describe the Kruskal's algorithm. **(10)**
- Q.6** Describe the Warshall's algorithm. **(10)**
- Q.7** Write short notes on : **(10)**
a) Equivalence relation
b) Types of function.

P.T.O.

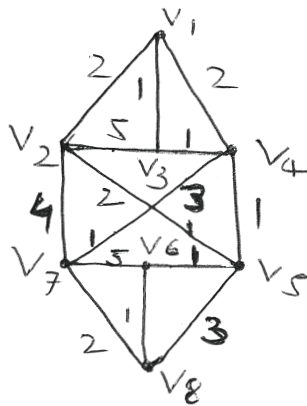
SECTION-II

Q.8 Explain Huffman code algorithm. Consider the string below: **(15)**
 ABBACDBADCCA.

The corresponding weights of the characters are
 $A = 3, B = 5, C = 2, D = 3$.

Obtain the total weight of the string and find out the Huffman code for each character.

Q.9 Describe the Prim's algorithm. Consider the following graph and obtain the minimal spanning tree using Prim's algorithm and determine the total weight of the tree. **(15)**



Q.10 Define Tree. Also write properties of Tree. Write an algorithm for preorder, inorder and postorder tree transversal. **(15)**

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