EH-249

B.E. IInd Semester (CGPA) Inform. Tech.

Examination, 2019

Discrete Structure

Paper - IT - 205

Time : 3 Hours]   **[Maximum Marks : 60**

Note :- Attempt all questions. There in internal choice from question No. 2 to 6.

1. Define the following terms.   6×2=12

    (i)   Set

    (ii) Lettice

    (iii) Ring

    (iv) Graph

(v) Boolean Algebra

(vi) Relation.   05

2. (a) To prove that –

$$A \cap (B \cap C) = (A \cap B) \cap C$$

(b) Let $X = \{1,2\}$ and $y = \{a, b\}$, determine whether or not
each of the following in equal to X×Y-   05

(i) $A = \{(1, a), (1, b), (2, a), (2, b)\}$

(ii) $B = \{(1, a), (1, b), (2, a), (b, 2)\}$

(iii) $C = \{(a, 1), (a, 2), (b, 1), (b, 2)\}$

(iv) $D = \{(1, a), (2, a), (1, a), (2, b)\}$

3. (a) What do you understand by questifiers in predicate logic ?

                                                                 05

(b) Prove that (Using table) :   05

$$p \Leftrightarrow q \Leftrightarrow (p \Rightarrow q) \wedge (q \Rightarrow p)$$

is a taytology

OR

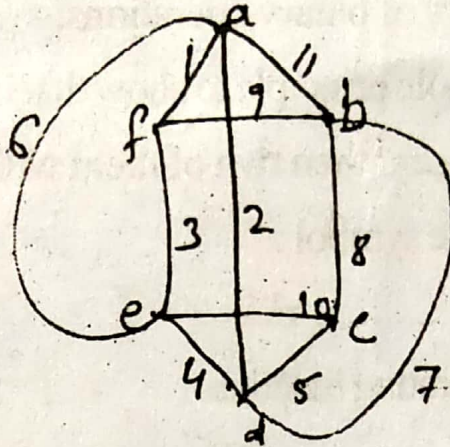(a) Show that the following is equivalent formula.   05

$$p \vee (p \wedge q) \Leftrightarrow p$$

(b) Define finite state machines. Explain. State table and flate
diagram of a finite mechine with the help of a suitable
diagram.

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4. (a) Determine the minimum spanning tree for following graph using prism algorithm. 05

(b) Define cut sets. Units properties of cut sets and explain fundamental cut sets. 05

OR

Give difinition with example : 10

(a) Regular graph

(b) Complete graph

(c) Isomorphic and homomorphic graph :

(d) Hamiltanian and Euler circuit.

5. (a) Explain semigroup and groups. 5

(b) Explain the properties of ring & fields. 4

OR

(a) Explain the properties of Binary operations. 5

(b) What is semigroup ? Prove that (A, t) is a semigroup where A be the set of all possitive even integers and t be the ordinary of binary operations.   4

6. (a) Use pigenhole principle to show that if any no.5 from 1 to 8 are choosen, then two of them will add to 9.   05

    (b) Evaluate the symbol :   05

    $$1^2+2^2+3^2+ \ldots\ldots\ldots\ r^2$$

    Using generating function.

OR

(a) Explain graph colouring.   05

(b) Determine the particular solution for the diferent equation :

$$a_r - 3a_{r-1} + 2a_{r-2} = 2^r$$

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