

2011

B. E. 3rd Semester (I.T.) Examination, December-2012

DISCRETE STRUCTURE

Paper-CSE-203-E

Time allowed : 3 hours]

[Maximum marks : 100

Note : Do any five questions.

1. (a) What do you mean by Multisets ? Also explain the different operations on Multisets. 10
(b) Prove that
$$A \times (B \cup C) = (A \times B) \cup (A \times C)$$
 10
2. (a) What do you mean by Relation ? Explain the different properties of relation. 10
(b) What do you mean by Equivalence Relation and Partial Order Relation ? Explain. 10
3. (a) What do you mean by functions ? Explain different types of functions. 10
(b) What do you mean by Lattices ? Explain in detail. 10
4. (a) What do you mean by Propositions? Explain the Fundamental and Derived Connectors. 10
(b) Consider the following Propositions
$$\sim P \vee \sim q \text{ and } \sim (P \wedge q)$$

are they equivalent. 10

5. (a) What do you mean by generating functions ?
Explain in detail.

(b) Solve the difference equation

$$a_r + 6a_{r-1} + 9a_{r-2} = 3$$

with initial conditions $a_0 = 0$ and $a_1 = 1$. 10

6. (a) Give a brief description about Pigeon hole Principle. Explain. 10

(b) Determine value of n if

(i) ${}^nC_4 = {}^nC_3$

(ii) ${}^nC_{n-2} = 10$

(iii) ${}^{20}C_{n+2} = {}^{20}C_{2n-1}$ 10

7. (a) Explain the Lagrange's Theorem in detail. 10

(b) Explain the following :

(i) Rings

(ii) Cosets

(iii) Cyclic Group. 10

8. (a) Explain the Kruskal's Algorithm to find minimum Spanning Tree. 10

(b) Explain the Dijkstra's algorithm to find shortest path in weighted graph. 10