

AQ-951

11. (a) Explain the different faults that occur in combinational switching circuit. 7
- (b) What is the partial recursive function ? Explain with example. 6

OR

12. (a) Write down the algorithm for generating the fault matrix. 7
- (b) Explain the finite state acceptor and regular grammar. 6

M.Sc. Part-I Semester-II (CBCS Scheme) Examination
(New Course)

COMPUTER SCIENCE

(Discrete Mathematical Structures)

Paper—2 MCS 4 (1)

Time : Three Hours] [Maximum Marks : 80

- Note :-** (1) ALL questions are compulsory.
(2) Figures to the right indicate full marks.
(3) Assume suitable data wherever necessary.
(4) Illustrate your answers with the help of neat sketches wherever necessary.

1. (a) Show that :
 $(\neg P \wedge (\neg Q \wedge R)) \vee (Q \wedge R) \vee (P \wedge R) \Leftrightarrow R$ 7
- (b) Explain the following :
 (1) Duality law
 (2) Tautological Implication. 6

OR

2. (a) Obtain principal disjunctive normal form of
 $(P \wedge Q) \vee (\neg P \wedge R) \vee (Q \wedge R)$ 6
- (b) Write formulas which are equivalent to the formulas given below and contains the connectives $\wedge$ and $\neg$ only.
 (i) $\neg(P \Leftrightarrow (Q \rightarrow (R \vee P)))$
 (ii) $((P \vee Q) \wedge R) \rightarrow (P \vee R)$ 7

3. (a) Explain the following with example :
 (i) Inclusion and equality set
 (ii) Power set. 6
 (b) Explain the concept of composition of function with suitable example. 7

OR

4. (a) What is Relation ? Explain the properties of binary relations in a set. 7
 (b) Draw a Venn diagram to illustrate :
 $(A \cup (B \cap C)) = (A \cup B) \cap (A \cup C)$
 where A, B, C are any three sets, 6
 5. (a) What is algebraic system ? Explain the general properties of algebraic system. 7
 (b) What is left coset and right coset ? Also explain the Lagrange's theorem with example. 7

OR

6. (a) Define the following terms :
 (i) Group
 (ii) Monoid Homomorphism
 (iii) Subgroups
 (iv) Homomorphism. 8
 (b) Explain the communication model and basic notations of error correction. 6

7. (a) List and explain the properties of lattice. 6
 (b) Explain the boolean forms and free boolean algebras with suitable example. 8

OR

8. (a) Define the following special lattices :
 (i) Complete lattice
 (ii) Distributive lattice
 (iii) Complemented lattice. 6
 (b) What is finite state machine ? Explain. 8
 9. (a) Explain :
 (i) Graph
 (ii) Tree
 (iii) Path. 6
 (b) What is List Structure ? Explain how the list structure is represented in the form of graph with suitable example. 7

OR

10. (a) Explain the following :
 (i) Reachability
 (ii) Connectedness. 6
 (b) Write down the for formal definition of precedence relations. 7