

D 20626-A

(Pages : 2)

Name.....

Reg. No.....

**THIRD SEMESTER B.TECH. (ENGINEERING) DEGREE  
EXAMINATION, OCTOBER 2011**

CS/IT 09 304/PTCS 09 303—DISCRETE COMPUTATIONAL STRUCTURES

(2009 admissions)

Time : Three Hours

Maximum : 70 Marks

**Part A**

*Answer all questions.*

1. Explain contrapositive.
2. Explain equivalence relation.
3. Explain inverse functions.
4. Define Hamming code.
5. Solve following recurrence relations. Assume  $n$  is even :

$$T(n) = T(n - 2) + 1, T(0) = 1.$$

(5 × 2 = 10 marks)

**Part B**

*Answer any four questions.*

6. Prove that  $\neg(p \wedge q) \Leftrightarrow \neg p \vee \neg q$ .
7. Find the number of functions from  $m$ -element set to an  $n$ -element set.
8. Draw the Hasse diagram for the poset  $(A, (\text{subset}))$ , where  $A$  denotes the power set of set  $(a, b, c)$ .
9. Prove that  $G$  is a abelian group if and only if  $(a \cdot b)^2 = a^2 \cdot b^2$  for all  $a, b \in G$ .
10. Show that  $Z_7 = \{(1, 2, 3, 4, 5, 6), * \text{ mod } 7\}$  is cyclic group.
11. Solve  $f(n) = f(n-1); f(0) = 1$ .

(4 × 5 = 20 marks)

**Part C**

*Answer section (a) or section (b).*

12. (a) Show that any proposition  $e$  can be transformed into CNF.

*Or*

- (b) Find disjunctive normal form of the following formula :

$$(P \wedge Q) \vee (\neg P \wedge Q) \vee (Q \wedge R).$$

**Turn over**