

**THIRD SEMESTER B.TECH. (ENGINEERING) DEGREE  
EXAMINATION, NOVEMBER 2013**

CS/IT 09 304—DISCRETE COMPUTATIONAL STRUCTURES

Time : Three Hours

Maximum : 70 Marks

**Part A**

*Answer all questions.*

*Each question carries 2 marks.*

1. Distinguish between universal and existential quantifiers.
2. What do you mean by equivalence relation ?
3. Explain inverse function with an example.
4. Define Group codes.
5. What do you mean by hamming matrix ?

(5 × 2 = 10 marks)

**Part B**

*Answer any four questions.*

*Each question carries 5 marks.*

6. Using truth table verify that the proposition  $(P \wedge Q) \wedge \neg (P \vee Q)$  is a contradiction.
7. By using truth table verify whether the following specifications are consistent: "Whenever the system software is being upgraded users cannot access the file system. If users can access the file system, then they can save new files. If users cannot save new files then the system software is not being upgraded".
8. If  $f: A \rightarrow B$  and  $g: B \rightarrow C$  are mappings and  $g \circ f: A \rightarrow C$  is one-to-one (Injection), prove that  $f$  is one-to-one.
9. Prove that monoid homomorphism preserves invertibility and monoid epimorphism preserves zero element (if it exists).
10. Show that group homomorphism preserves, identity, inverse and subgroup.
11. Is the lattice of divisors of 32 a Boolean algebra ?

(4 × 5 = 20 marks)