Code: IUT 9A05301

IUT

B. Tech II Year I Semester (R09) Supplementary Examinations, May 2013
MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE
(Electronics & Communication Engineering)

Time: 3 hours   Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks
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1   (a)   Define conditional and bi-conditional statements with truth tables.
    (b)   Define conjunction and disjunction with truth tables.

2   (a)   Write the quantifiers of the following statements:
          (i) Some vegetable is sweeter than all fruits.
          (ii) Every fruit is sweeter than all vegetables.
          (iii) Every fruit is sweeter than some vegetables.
          (iv) Only fruits are sweeter than vegetables.
    (b)   Show that R is a valid conclusion from the premises $(p \to q) \to R$, $p \wedge s$ and $q \wedge T$.

3   (a)   Explain the inclusion – exclusion principle.
    (b)   Consider a set of integers from 1 to 250 find how many of these numbers are divisible by 3
          or 5 or 7 also indicate how many are divisible by 3 or 7 but not by 5 & divisible by 3 or 5.

4   (a)   Let G be a group then prove that $Z(G) = \{x \in G \ / \ xg = gx$ for all $g \in G\}$ is a sub group of G.
    (b)   Let P(s) be the power set of a non-empty set s. Let n be an operation in P(s). Prove that
          associative law and commutative law are true for the operation n in P(s).

5   (a)   In how many ways can a person climb up a flight of n steps if the person can skip at most
          one step at a time?
    (b)   Solve the recurrence relation $a_n - 7a_{n-1} + 12a_{n-2} = 3^n$, for $n >= 2$.

6   (a)   If two distinguishable dice are rolled, in how many ways can they fall? If 5 distinguishable
          dice are rolled, how many possible outcomes are there. How many if 100 distinguishable
          dice are rolled?
    (b)   State the principle of inclusion and exclusion.

7   Explain different graph traversals with an example.

8   Define the following with an example:
          (i)   Path.   (ii) Circuit.   (iii) Discrete graph.
          (iv) Linear graph.   (v) Regular graph.   (vi) Complete graph.
          (vii) Sub graph.

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