Code No: 09A30501 **R09**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, HYDERABAD
B.Tech II Year I Semester Examinations, June/July-2014
MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE
(Common to CSE, IT)

Time: 3 hours **Max. Marks: 75**

Answer any five questions
All questions carry equal marks
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1.a) Obtain the CNF of the following formulae:
i) $P \otimes (P \rightarrow Q)$
ii) $\neg (P \oplus Q) \leftrightarrow (P \otimes Q)$
b) Discuss the methods to determine whether any two statement formulae are equivalent.

2.a) Show that the following premises are inconsistent
If Ram misses many classes through illness then he fails high school.
If Ram fails high school, then he is uneducated.
If Ram reads a lot of books, then he is not educated.
Ram misses many classes through illness and reads a lot of books.
b) Describe the theory of inference.

3.a) Let A = {1, 2, 3, …, 9} and let ~ be the relation on A × A defined by (a, b)~(c, d) iff a + d = b + c then prove that ~ is an equivalence relation on A × A.
b) Draw Hasse diagram of Poset $(D_{45}, /)$.

4.a) Show that the set Q under the binary operation o defined by a o b = a+b/2 is not a semi group.
b) Use Lagrange's theorem prove that a finite group cannot be expressed as the union of two of its proper subgroups.

5.a) Find the middle term of $(x + 1/x)^{20}$.
b) Find the number of integers between 1 and 1000 inclusive that are divisible by none of 5, 6 and 8.

6.a) Find a generating function for the sequence 1,0,1,0,1,0,…..
b) Find a solution to $a_n - a_{n-1} = 3(n-1)$ where $n>=1$ and $a_0 = 2$.

7.a) What are the steps involved in graph traversal using breadth first search algorithm? Illustrate with a graph example.
b) What is a spanning tree? Where are they useful? Discuss any one algorithm for finding spanning tree.

8.a) Define isomorphism. What are the steps followed in discovering the isomorphism?
b) How many vertices does the graph have if it contains 21 edges, 3 vertices of degree 4 and the other vertices of degree 3?

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