Nepal College of Information Technology

**Unit Test**

Spring 2013

Program : BE IT Time : 2 hrs

Semester : Spring (II) FM : 60

Subject : MFCS PM : 30

* *Candidates are requested to give their answer as far as practicable in their own words.*
* *The figure in the margin indicates the full marks*
* ***Attempt ALL question***

1. a) Define logical equivalence. Show that the propositions p  (q r) and (pq)  (p r) are logically equivalent. [8]

1. State the rules of inference for propositional logic. Verify that the following argument is valid using the rules of inferences.

If Clinton does not live in France, then he does not speak French. Clinton does not drive a Datsun. If Clinton lives in France, then he rides a motorcycle. Either Clinton speaks French or He drives a Datsun. Hence Clinton rides a motorcycle. [8]

2. a) Differentiate between proof by contradiction and proof by contra positive with an example. [10]

b) Differentiate between universally quantified and existentially quantified statement. What is the truth value of the statement, for every real number x, x2-1>0 [8]

3. a) Define mathematical induction. Using mathematical induction, show that 8n – 3n is divisible by 5. [8]

b) State the principle of resolution. Use resolution to show that the hypotheses.” It is not raining or Ram has his umbrella”, “Ram does not have his umbrella or he does not get wet” and “It is raining or Ram does not get wet” imply that “Ram does not get wet”. [8]

4. Writes short notes on (any two) [2\*5=10]

a) Tautology vs contradiction.

b) Rules of inference for quantified statements.

d) De- Morgan’s law for propositional logic.