Nepal College of Information Technology

**Assessment**

Spring 2015

Program : BE IT Time : 3 hrs

Semester : Spring (II) FM : 100

Subject : MFCS PM : 50

* *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 complete Bi-partite graph. Show that a graph k5 is non-planar [7]

b) Explain the different ways of computer representation of graph with examples. [8

2 a) Define planar graph. State and prove Euler’s formula for planar graph. [7]

b) Define minimum spanning tree. Generate minimum spanning tree from the following graph using Kruskal's algorithm. [8]

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a

b

1

c

6

z

7

2

4

2

g

1

1

1

1

3

d

f

e

**.**

3 a) Define tautology, contradiction, contingency and logical equivalence with an example. [8]

b) 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]

4 a) State rules inference for quantified statements. Give an argument using rules of inference to show that the conclusion follows from the hypotheses. [8]

Hypotheses: Everyone in this class has a graphing calculator. Everyone who has graphing calculator understands the trigonometric functions.

Conclusion: Ralphie, who is in the class, understands the trigonometric functions [8]

4 b) Define Direct proof with an example. Using proof by contradiction, show that the difference of a rational and an irrational number is irrational. [7]

5 a) Explain the process of generating characteristic equation of linear homogeneous recurrence relation. What is solution of the recurrence relation an = an-1 + 2an-2 with a0 =2 and a1=3,?  [8]

b) Define recurrence relation. Generate a recurrence relation for tower Hanoi puzzle and identify its solution [7]

6 a) Define regular expression. Construct a FA for the following regular expressions. [8]

a)01(01+0)1\*

b)0\*(10)\*11

b) Define grammar. Explain different types of grammar. [7]

7 Write short notes on (any two) [5\*2=10]

a) Prim's algorithm.

b) Predicate logic.

c) Proof by contra-positive.