The Open University of Sri Lanka
B. Sc. Degree Programme – Level 04
Open Book Test 2009/2010
CSU 2280:Deductive Reasoning and PROLOG for AI
Duration: One and a half hours

03.09.2009 4.00 pm – 5.30 pm

Answer All Three Questions.

Q1.

a. "A problem can be solved by using different reasoning techniques" Do you agree with this statement? Explain briefly.

b. Using suitable examples briefly describe the following:

i. Deductive reasoning
ii. Search and Match reasoning
iii. Inductive reasoning

c. Explain the reasoning technique that can be used to solve the following:

i. To develop a fully automated system for an airport
ii. To find a particular student result in the AL examination
iii. To find the particular color pattern in a given picture.
iv. To develop an e-library system
v. To develop a computer fault diagnosis system.

Q2.

a. What are Syllogisms?

b. Construct Truth tables to represent the following:

i. Tautology
ii. Contradiction
iii. Model assignment

c. Using truth tables, establish the following relationships:

i. $P \rightarrow Q \equiv \neg P \vee Q$
ii. $\neg(P \vee Q) \rightarrow \neg P \wedge \neg Q$
iii. $P \wedge (Q \vee R) \equiv (P \wedge Q) \vee (P \wedge R)$

d. Using suitable examples define the term "semantic" in propositional logic.

Q3.

a. What are the key limitations of propositional logic?

b. Using your own words, explain the meaning of the following logic formula:

   i. $\exists x F(x)$
   ii. $\exists x \forall y F(x, y)$
   iii. $\forall x P(x) \wedge \forall y F(y)$

c. Using your own words, interpret the following predicate logic formulae, by indicating the additional condition on x or y, which makes the expression true.

   i. $\forall x \exists y\ (x+1 = y)$
   ii. $\exists y \forall x\ (y+x = x)$
   iii. $\forall x \exists y\ (x+y = y+x)$

d. Write the following sentences using predicate logic.

   a. Saman is Sri Lankan.
   b. Some men hate all failures.