



Duration : One and half hours

Date 22.08.2006

Time: 3.30 p.m. to 5.00 p.m.

Answer All Three Questions.

Q1.

- a. "Dynamic reasoning process allows us to draw conclusions based on incomplete and inconsistent set of information". Consider the above statement and give three examples for dynamic reasoning.
- b. Explain the differences between search and match reasoning techniques and deductive reasoning techniques.
- c. Describe the following terms with suitable examples. (Do not write example given in your course material)
  - i. Inductive reasoning
  - ii. Case-Based reasoning
  - iii. Abductive reasoning

Q2.

- a. Which of the following are valid formulas of propositional calculus? Give the reasons.
  - i.  $\neg P \vee Q \rightarrow \neg Q$
  - ii.  $\neg P \vee Q \wedge R$
  - iii.  $(A \rightarrow B) \vee C$
  - iv.  $A \rightarrow B \vee C \wedge A$
- b. Determine which of the following are tautologies or contradictions or neither of them. Write down model expressions and counter examples when they exist.
  - i.  $(A \rightarrow B) \rightarrow (A \vee \neg B)$
  - ii.  $((A \rightarrow B) \wedge A) \rightarrow B$
  - iii.  $(A \vee B) \vee ((\neg A) \wedge (\neg B))$
  - iv.  $(A \wedge B) \wedge ((\neg A) \vee (\neg B))$
  - v.  $(B \rightarrow \neg A) \wedge A \rightarrow \neg B$
- c. Using the method of truth table, show that
  - i.  $(P \rightarrow Q) \equiv (\neg P \vee Q)$
  - ii.  $(P \wedge R) \rightarrow (Q \vee S) \equiv (\neg P \vee \neg Q \vee R \vee S)$
  - iii.  $(P \rightarrow (Q \wedge R)) \equiv ((P \rightarrow Q) \wedge (P \rightarrow R))$

Q3.

Write the following sentences using propositional logic. Thereafter, using truth tables show that:

- a. If the weather is warm and the sky is clear, then either we go swimming or we go boating. It is not the case that if we do not go swimming, then the Sky is not clear. Therefore, either the weather is warm or we go boating.
- b. If Sunil is elected as the president in a particular society, then either Kamal is elected as the vice president or Ruvini is elected as the treasurer. Kamal is elected as the vice president. Therefore, if Sunil is elected as the president, then Ruvini is not elected as the treasurer.

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