



**EASTERN UNIVERSITY, SRILANKA**

**THIRD EXAMINATION IN SCIENCE-2005/2006**

**FIRST SEMESTER (Aug/Sep, 2007)**

**Artificial Intelligence - CS 304**

**(Proper & Repeat)**

**Answer all Questions**

**Time Allowed: 2 Hours**

Q1)

- a) Briefly describe the term “AI technique”? (15)
- b) Clearly explain “State Space Representation”. (10)
- c) Briefly describe the “Breadth – First Search”. (20)
- d) Consider the following problem: (55)

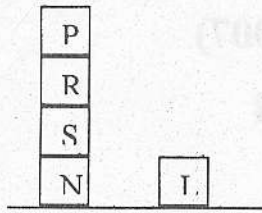
“You are doing some research in the laboratory; you urgently need two liters of water to continue your successful process. Water is available in the tap. But there is no measurement units available in the laboratory. Only you have two jars with the maximum capacity of ten liters and seven liters. There are no measurement units available in the jars. You are requested to catch the two liters of water into the ten liters jar.

- i) Define the production rules for this problem.
- ii) Draw the state space for this problem using “Depth – First Search” technique.
- iii) List all the possible solutions of this problem.

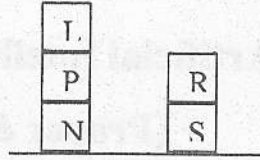
Q2)

- a) Clearly describe the major components of a “Planning System”. (16)
- b) Express the “STRIPS” style to the block world operators “STACK”, “UNSTACK”, “PICKUP”, and “PUTDOWN” using clear definitions of “P(Precondition)”, “D(Delete)”, and “A(Add)”. (24)

- c) Consider a block world consisting of a number of blocks on a table and robot – arm which can handle only one block at a time. Assuming that there is enough space on the table and the robot – arm is empty in initial state. Use the “goal stack planning” concepts to find out the goal state of the following: (60)



Initial State



Goal State

Q3)

- What do you mean by the term “Heuristic Search”?
- Briefly describe the algorithm of “Steepest – Ascent Hill Climbing”.
- Clearly explain the “Best – First Search” using the “OR Graph”.
- Explain “A\*” algorithm and its use? (20)
- What is the purpose of using the “Constraint Satisfaction” in AI?

Q4)

- Briefly explain the “Resolution” algorithm in “Predicate Logic”.
- Why are we using “Unification” in “Predicate Logic”? Explain with an algorithm.
- Consider the following statements:
  - Jhon likes all kind of food.
  - Apples are food.
  - Chicken is food.
  - Anything anyone eats and isn’t killed by is food.
  - Bill eats peanuts and is still alive.
  - Sue eats everything Bill eats.
  - Translate these sentences into formulas in predicate logic.
  - Prove that Jhon likes peanuts using backward chaining.
  - Convert the formulas of part (i) into clause form.
  - Using resolutions, prove that Jhon likes peanuts.