**COMPUTER & INFORMATION TECHNOLOGY DEPARTMENT**

**FOUNDATIONS OF ARTIFICIAL INTELLIGENCE**

**Question 1**

[10 Marks]

A farmer with his dog, rabbit and lettuce come to the east side of a river they wish to cross. There is a boat at the river’s edge, but of course only the farmer can drive. The boat can only hold two items including the driver at any one time. If the dog is ever left alone with the rabbit, the dog will eat it. Similarly if the rabbit is ever left alone with the lettuce, the rabbit will eat it. How can the farmer get across the river so that all four

characters arrive safely on the other side?

**Question 2**

(i) Suggest a suitable representation for the problem state

(ii) State what are the initial and final states are in this representation

(iii) State the possible operators/rules for getting from one state to another, giving any conditions and when they may be applied.

[10 Marks]

You are given an instance of the traveling salesperson problem (TSP). A salesperson has to visit a group of cities, visiting each only once and getting back to the starting city. The objective is to minimize the total distance traveled. Assume each city is directly connected to each other city. Describe a state-space representation for the problem,

specifying:-

(i) Initial state (ii) Goal state(s) (iii) Operators

[10 Marks]