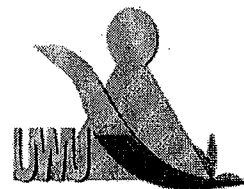
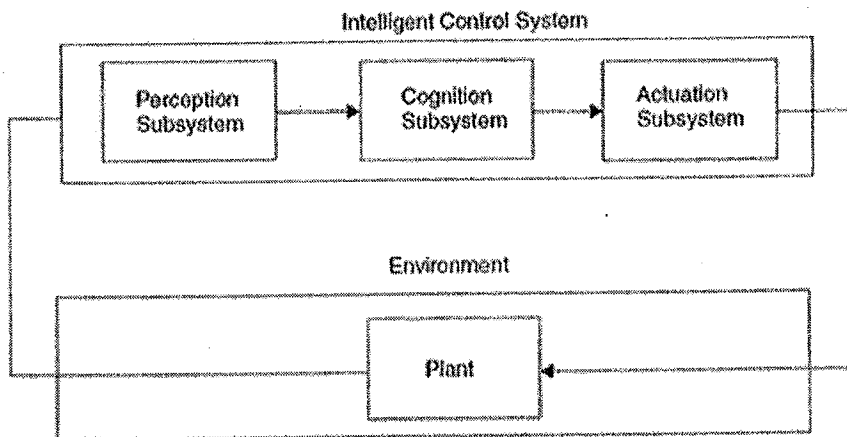


Uva Wellassa University, Sri Lanka
End Semester Examination – February/March 2012
SCT 466-2 Intelligent Systems
Time: Two (02) Hours



Total 02 Questions
Answer All questions

- 1.
- a. Following block diagram shows the structure of an Intelligent Control System. Explain briefly,
- I. Perception Subsystem
 - II. Cognition Subsystem
 - III. Actuation Subsystem.



(20 Marks)

- b. Explain how a temperature varying from 0-100 °C can be represented by three Fuzzy membership functions of "LOW", "MEDIUM" and "HIGH".

(20 Marks)

- c. Draw 4 (four) common shapes of fuzzy membership functions.

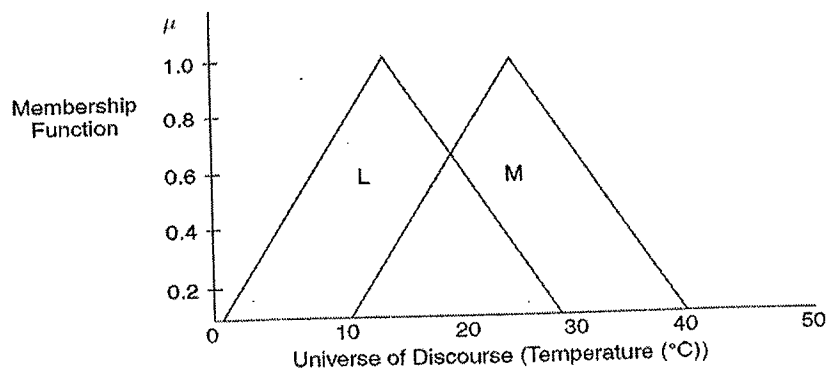
(10 Marks)

- d. Following figure shows two membership functions (L and M) used in a fuzzy logic controller.

- I. Show in a separate figure "Union" and "Intersection" of L and M.

II. Explain how "Union" and "Intersection" are represented in Fuzzy rules.

(20 Marks)



e. You are required to design a Fuzzy Intelligent System to estimate tip given to a waiter for a dinner taken in a restaurant. Tip can vary from 0%-5% of the total bill. Both Taste of the food and the quality of the services can be rated by numbers from 0-10. Number 10 represents highest quality and delicious food in each respective scale. Design a Fuzzy Logic system in order to calculate the tip. You are required to

- I. Draw membership function for inputs and outputs
- II. Develop fuzzy rule base.
- III. Apply implication method for each fuzzy rule.
- IV. Apply defuzzification to calculate Tip for a service of 3 and food taste of 8.

(30 Marks)

2.

a. Explain using a diagram, how an artificial neuron mimics the behavior of a biological neuron.

(20 Marks)

b. Explain difference between single layer feed forward network and multi-layer feed forward network.

(20 Marks)

c. What is supervised learning and what is unsupervised learning? Explain the difference between each of these learning methods.

(20 Marks)

d. Explain how to determine whether a system is linearly separable for a two input Neural Network. Give example for a linearly separable system.

(20 Marks)

e. Following figure shows the first step of representing a Boolean AND gate using Neural Network. Threshold function activates when the weighted sum of inputs are greater than the value of zero. Adjust the each weight using the perceptron learning algorithm until neural network correctly represents the AND operation. X and Y are the binary inputs to the AND Logic gate. You are required to draw separate neural network for each of the step of the learning process.

(40 Marks)

X	Y	OUTPUT
0	0	0
1	0	0
0	1	0
1	1	1

