CE1.2-R4: MACHINE LEARNING

NOTE:

1. **Answer question 1 and any FOUR from questions 2 to 7.**
2. **Parts of the same question should be answered together and in the same sequence.**

Time: 3 Hours **Total Marks: 100**

1. Explain in brief:

a) Differentiate object classification and recognition?

b) Differentiate supervised and unsupervised learning?

c) Discuss the relation between machine learning and artificial intelligence?

d) Define Reinforcement learning?

(4x7)

2. Imagine you regularly travel between Delhi and Agra for work. Assuming you work a 7-day week, you usually spend 4 days in Delhi, and 3 days in Agra. You wake up one morning, and cannot remember where you are. You notice that it is raining. You know that in general, it rains about 3 days per week. You know that in Delhi in particular, it rains about 2 days per week. You know that 80% of the time, it rains in Agra. Calculate the probability that you have woken up in Agra. Remember, the probability of rain in general is not the same as the probability of you seeing the rain.

(18)

3.

a) Explain why inductive learning should require more inference than learning by instruction.

b) Differentiate observable variable and unobservable variable?

c) Describe the role of each component of a general learning model and why it is needed for learning process?

(6+6+6)

4.

a) Define the concept of Support Vector Machines.

b) Discuss the steps and illustration to find maximum margin separators using quadratic programming solutions.

(6+12)

5.

a) What are the applications of Artificial Neutral network in Machine learning?

b) Give 5 advantages and 5 disadvantages of using K-NN rule in machine learning.

(9+9)

6.

a) Represent following sentences using symbolic logic :

   i) A drunker is enemy of himself
   ii) John likes Jinny
   iii) Fruit and vegetables are nutrition
   iv) God help those who help themselves

b) "***Some medicines are dangerous only if taken in excessive amount***". Translate the above sentence into formulas in predicate logic and then to clause form.

(12+6)

7. Write short notes on **any three**:

a) The importance of inductive bias

b) Statistical hypothesis testing

c) First order Horn clause induction

d) Markov nets

e) Parameters to measure the accuracy of learned hypothesis.

(3x6)