

(3Hrs)

Max Marks: 80

N.B.: (1) Question No. 1 is compulsory.

(2) Attempt any three of remaining five questions.

(3) Assume any suitable data if necessary and clearly state it.

1. (a) Define well posed learning problem. Hence, define robot driving learning problem. [05]
- (b) Explain, in brief, Bayesian Belief networks. [05]
- (c) Write short note on Temporal Difference Learning. [05]
- (d) Explain procedure to construct decision trees. [05]
2. (a) Explain how support vector machine can be used to find optimal hyperplane to classify linearly separable data. Give suitable example. [10]
- (b) Explain procedure to design machine learning system. [10]
3. (a) What is linear regression? Find the best fitted line for following example: [10]

i	x_i	y_i	\hat{y}_i
1	63	127	120.1
2	64	121	126.3
3	66	142	138.5
4	69	157	157.0
5	69	162	157.0
6	71	156	169.2
7	71	169	169.2
8	72	165	175.4
9	73	181	181.5
10	75	208	193.8

- (b) What is decision tree? How you will choose best attribute for decision tree classifier? Give suitable example. [10]
4. (a) Explain K-mean clustering algorithm giving suitable example. Also, explain how K-mean clustering differs from hierarchical clustering. [10]
- (b) What is kernel? How kernel can be used with SVM to classify non-linearly separable data? Also, list standard kernel functions. [10]

- 5. (a) What is Q-learning? Explain algorithm for learning Q. [10]
- (b) Explain following terms with respect to Reinforcement learning: delayed rewards, exploration, and partially observable states. [10]
- 6 Write short notes on
 - (a) Soft margin SVM [05]
 - (b) Radial Basis functions [05]
 - (c) Independent Component Analysis [05]
 - (d) Logistic Regression [05]
