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B. TECH.
(SEM VII) THEORY EXAMINATION 2022-23
MACHINE LEARNING

Time: 3 Hours**Total Marks: 100****Note:** Attempt all Sections. If you require any missing data, then choose suitably.**SECTION A**

- 1. Attempt all questions in brief. 2x10 = 20**
- (a) Explain the applications of machine learning in industry 4.0.
 - (b) State the example of classification problem.
 - (c) Differentiate between Training data and Testing Data in ML
 - (d) Define the Polynomial Regression.
 - (e) Explain the Multidimensional Scaling.
 - (f) Define K-Means Clustering.
 - (g) Describe artificial intelligence (AI).
 - (h) What is the difference between Root Node & Decision Node
 - (i) Explain the meaning of reproduction in genetic algorithm
 - (j) Explain the difference between reinforcement learning and deep learning?

SECTION B

- 2. Attempt any three of the following: 10x3 = 30**
- (a) Explain the Differentiate between Supervised, Unsupervised and Reinforcement Learning
 - (b) What is Support vector machine (SVM) and how does it work? Explain the advantages & Disadvantages of SVM.
 - (c) Show the application of Clustering in various sectors, discuss with following examples: Marketing, Insurance & Earth-quake studies.
 - (d) Explain Backpropagation algorithm in artificial neural network (ANN) with suitable example.
 - (e) Discuss the Genetic algorithm (GA) with suitable example. Also explain its advantages and applications

SECTION C

- 3. Attempt any one part of the following: 10x1 = 10**
- (a) Explain with a neat diagram, application of ML in healthcare and Banking sectors.
 - (b) Show the machine learning how works with Netflix, Facebook, and amazon websites.
- 4. Attempt any one part of the following: 10 x1 = 10**
- (a) Is regression a supervised learning technique? Justify your answer. Compare regression with classification with examples.
 - (b) What is regression in machine learning with example?
- 5. Attempt any one part of the following: 10x1 = 10**
- (a) Draw the cluster of following 8 points into 3 clusters:
 $A1=(10,7)$, $A2=(8,6)$, $A3=(9,4)$, $A4=(5,8)$, $A5=(7,5)$, $A6=(7,4)$, $A7=(3,2)$, $A8=(4,9)$.
 Use the k-means algorithm and Euclidean distance and take the Initial cluster centers are $A2(8, 6)$, $A4(5, 8)$ & $A8(4,9)$. The solution up to two iterations.
 - (b) Use the Nearest Neighbor clustering algorithm and Euclidean distance to cluster: $A1=(5,4)$, $A2=(2,5)$, $A3=(8,4)$, $A4=(5,8)$, $A5=(7,5)$, $A6=(6,4)$, $A7=(1,2)$, $A8=(4,9)$. Suppose that the threshold t is 4.

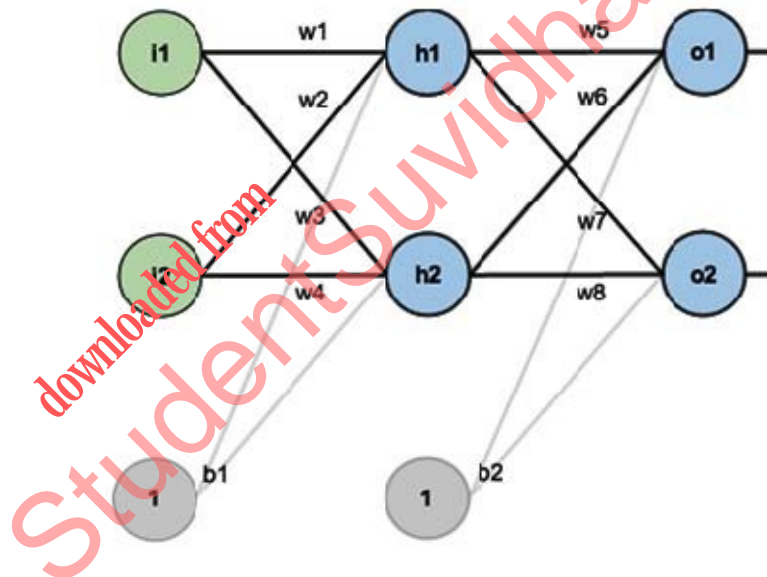
6. Attempt any one part of the following:

10x1 = 10

- (a) Construct the decision tree for the given data set & Calculate the entropy and information gain.

DAY	Outlook	Temperature	Humidity	Windy	Play Golf
D1	Rainy	Hot	High	Weak	No
D2	Rainy	Hot	High	strong	No
D3	Overcast	Hot	High	Weak	Yes
D4	Sunny	Mild	High	Weak	Yes
D5	Sunny	Cool	Normal	Weak	Yes

- (b) Let us consider an artificial neural network (ANN) as shown in fig. with input values $I_1 = 0.05$, $i_2 = 0.05$, Bias values $b_1 = 0.35$, $b_2 = 0.60$, Target vales $T_1 = 0.01$, $T_2 = 0.99$, initial weights $w_1 = 0.15$, $w_2 = 0.20$, $w_3 = 0.25$, $w_4 = 0.30$, $w_5 = 0.40$, $w_6 = 0.45$, $w_7 = 0.50$, $w_8 = 0.55$. Calculate Input & Output of hidden stage & output stage. Finally, calculate the total Error in one iteration of forward pass in back propagation Algorithm.



7. Attempt any one part of the following:

10x1 = 10

- (a) What is a genetic algorithm and its advantages? Explain with suitable example
- (b) What do you mean by Reinforcement learning and its types? How does Reinforcement Learning Work?