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DAYANANDA SAGAR COLLEGE OF ENGINEERING

(An Autonomous Institute Affiliated to VTU, Belagavi)
Shavige Malleshwara Hills, Kumaraswamy Layout, Bengaluru-560078

UG Semester End Examination, February/March 2022

Course: **Introduction to Machine Learning** Maximum marks: **100**
Course Code: **18CS7IEIML** Duration: **03 hours**
Semester: **VII**

Note: **i). Question ONE (a to t) has to be answered from pages 5 to 7 only, also candidate must write the answer along with the option.**
ii). Question 1 to 4 is compulsory.
iii). Any missing data should be suitably assumed

Q. No.		Marks
1a)	Fraud Detection, Image Classification, Diagnostic, and Customer Retention are applications in which of the following i) Unsupervised Learning: Regression ii) Supervised Learning: Classification iii) Unsupervised Learning: Clustering iv) Reinforcement Learning	01
b)	Machine Learning is a subset of _____ i) Deep Learning ii) Artificial Intelligence iii) Data Learning iv) None	01
c)	What are the three types of Machine Learning? i) Supervised Learning ii) Unsupervised Learning iii) Reinforcement Learning iv) All	01
d)	Real Time decisions, Game AI, Learning Tasks, Skill acquistition and Robot Navigation are the applications of_____ i) Reinforcement Learning ii) Supervised Learning: Classification iii) Unsupervised Learning: Regression iv) None	01
e)	_____ refers to a model that can model the training data but not to test data. i) good fitting ii) Overfitting iii) Under fitting iv) All	01
f)	Decision trees can handle_____ i) High dimensional data ii) low dimensional data iii) medium dimensional data iv)none	01
g)	_____is a metric to measure how often a randomly chosen element would be incorrectly identified. i) Information Gain ii) Gini Index iii) Entropy iv) none	01
h)	Movie Recommendation systems are an example of _____ i) Classification ii) Clustering, Reinforcement Learning iii) Regression iv) supervised	01
i)	Which of the following is not clustering method? i) Density-Based ii) Hierarchical Based iii) Grid-based iv) Project Based	01
j)	What is the minimum no. of variables/ features required to perform clustering? i) 0 ii) 1 iii) 2 iv) 3	01
k)	Which of the following is required by K-means clustering? i) defined distance metric ii) number of clusters iii) initial guess as to cluster centroids iv) all	01
l)	In the K-Means algorithm, we have to specify the number of clusters. i) False ii) True	01
m)	ANN is used for i) Clustering ii) Pattern Recognition iii) Classification iv) All	01
n)	What is full form of ANNs? i) Artificial Neural Node ii) AI Neural Networks iii) Artificial Neural Networks iv) Artificial Neural numbers	01
o)	On Which mentioned points the Bayes Theorem is applicable? i) Dependent Events ii) Independent Events iii) Neither i. nor ii iv) Both i. and ii.	01
p)	The results that we get after we apply Bayesian Theorem to a problem are. i) 100% accurate ii) Estimated values iii) Wrong values iv) None	01
q)	Bayesian Belief Network is also known as? i) Belief network ii) decision network iii) Bayesian model iv) All	01
r)	Artificial Intelligence is about_____. i) Playing a game on Computer ii) Making a machine Intelligent iii) Programming on Machine with your Own Intelligence iv) Putting your intelligence in Machine	01
s)	Out of the two repeated steps in EM algorithm, the step 2 is _____ i).The maximization step ii) the minimization step iii) the optimization step iv) The	01

normalization step

t) Naive Bayes requires? 01

i) Categorical Values ii) Numerical Values iii) Either i or ii iv) Both i and ii

2 a) Differentiate between Supervised, Unsupervised and Reinforcement Learning with suitable examples? 10

b) Write a short note on bias and variance with a suitable diagram. 06

3 a) Justify as to how pruning helps in the formation of accurate decision tree by considering suitable example. 08

b) Summarize the concepts of entropy and information gain. With suitable example explain how entropy value helps in creation of decision tree. 08

4 a) Discuss the working principal of CURE algorithm in detail. 08

b) Discuss the algorithm Birch with a suitable explanation. 08

5 a) Analyze the dissimilarities between stochastic versus Non Stochastic gradient descent for neural network 08

b) Name the three layers in Artificial neural network Architecture. With a neat diagram explain ALVINN System that uses ANN to steer an autonomous vehicle driving at normal speeds on public highways. 08

OR

6 a) Analyze the appropriate learning problem for neural network with its important characteristics 10

b) Given a multilayer network with a fixed set of units and interconnections. Apply Back Propagation Algorithm that employs gradient descent to attempt to minimize the squared error between the network output values and the target values for these outputs. 06

7 a) Use naive baye's classifier to classify for the new data (today = (Sunny, Hot, Normal, False) using following table given below. 12

	Outlook	Play
0	Rainy	Yes
1	Sunny	Yes
2	Overcast	Yes
3	Overcast	Yes
4	Sunny	No
5	Rainy	Yes
6	Sunny	Yes
7	Overcast	Yes
8	Rainy	No
9	Sunny	No
10	Sunny	Yes
11	Rainy	No
12	Overcast	Yes
13	Overcast	Yes

b) Describe the advantages of naïve Bayes Classifier over other classification algorithms? 04

OR

8 a) Explain and elaborate the algorithm of Expectation and Maximization? 08

b) Discuss the Bayesian belief network and its conditional independence in detail with suitable notations? 08