Model Question Paper-1 with effect from 2019-20 (CBCS Scheme)

USN | | | | | | | | | | |

Seventh Semester B.E. Degree Examination

Advanced Machine Learning

TIME: 03 Hours **Max. Marks: 100**

Note: 01. Answer any **FIVE** full questions, choosing at least **ONE** question from each **MODULE**.

<table>
<tr><td colspan="3">Module – 1</td><td></td></tr>
<tr><td rowspan="2">Q.1</td><td>(a)</td><td>Using code snippets, explain the Gradient Descent Algorithm through utility methods.</td><td>10M</td></tr>
<tr><td>(b)</td><td>Contrast the features of Receiver Operating Curve (ROC) and Area Under ROC (AUC) score in Logistic regression model with code snippets.</td><td>10M</td></tr>
<tr><td colspan="3">OR</td><td></td></tr>
<tr><td rowspan="2">Q.2</td><td>(a)</td><td>In context to ARIMA Model, explain the following
i) Dicky-Fuller Test.
ii) Forecast and Measure Accuracy.</td><td>10M</td></tr>
<tr><td>(b)</td><td>With respect to Moving Average model discuss the different methos for calculating Forecast Accuracy.</td><td>10M</td></tr>
<tr><td colspan="3">Module – 2</td><td></td></tr>
<tr><td rowspan="2">Q.3</td><td>(a)</td><td>Show that how evaluation problem and learning problem issues are addressed by Hidden Markov Model.</td><td>10M</td></tr>
<tr><td>(b)</td><td>Using K-Medoids Algorithm solve the Problem for the following dataset of 6 objects as shown in the table below into clusters, for K=2.
<table>
<tr><td colspan="3">Data Object</td></tr>
<tr><td>Sample</td><td colspan="2">Points</td></tr>
<tr><td>X1</td><td>2</td><td>6</td></tr>
<tr><td>X2</td><td>3</td><td>4</td></tr>
<tr><td>X3</td><td>3</td><td>8</td></tr>
<tr><td>X4</td><td>4</td><td>2</td></tr>
<tr><td>X5</td><td>6</td><td>2</td></tr>
<tr><td>X6</td><td>6</td><td>4</td></tr>
</table>
Note: Randomly select 2 medoids cluster centers.</td><td>10M</td></tr>
<tr><td colspan="3">OR</td><td></td></tr>
<tr><td rowspan="2">Q.4</td><td>(a)</td><td>List and Explain applications of Clustering as well as requirements of Clustering.</td><td>10M</td></tr>
<tr><td>(b)</td><td>For the given set of points, identify the clusters using Agglomerative Algorithm Clustering: Complete Link, use Euclidian Distance and draw Final cluster formed.
<table>
<tr><td colspan="3">Data Object</td></tr>
<tr><td>Sample</td><td colspan="2">Points</td></tr>
<tr><td>X1</td><td>1</td><td>1</td></tr>
<tr><td>X2</td><td>1.5</td><td>1.5</td></tr>
<tr><td>X3</td><td>5</td><td>5</td></tr>
<tr><td>X4</td><td>3</td><td>4</td></tr>
<tr><td>X5</td><td>4</td><td>4</td></tr>
<tr><td>X6</td><td>3</td><td>3.5</td></tr>
</table></td><td>10M</td></tr>
<tr><td colspan="3">Module – 3</td><td></td></tr>
<tr><td>Q.5</td><td>(a)</td><td>With the code snippets discuss the ways of applying Association Rules.</td><td>10M</td></tr>
</table>

	(b)	**Write a note** on User-Based Similarity Algorithm and Finding the Best Model**.**	**10M**
		OR	
Q.6	**(a)**	**List** and **Explain** importance of words in a Bag-of-Words (BoW) Model.	**10M**
	(b)	Using the code snippets discuss the challenges of text analytics.	**10M**
		Module – 4	
Q.7	**(a)**	**Explain** different types of activation functions for processing a node in Neural networks.	**7M**
	(b)	**Explain** the Learning process involved in the neural network that responds to a stimulus correctly.	**5M**
	(c)	**Solve** XOR function using McCulloch-Pitts neuron.	**8M**
		OR	
Q.8	**(a)**	Derive the Backpropagation rule considering the training rule for Output Unit weights and Training Rule for Hidden Unit weights.	**8M**
	(b)	Derive the Gradient Descent Rule and explain the importance of Stochastic Gradient Descent.	**6M**
	(c)	**Prove** the population evolution and the schema theorem incontext to genetic algorithm	**6M**
		Module – 5	
Q.9	**(a)**	**Prove** the K – nearest neighbor algorithm for approximating a discrete – valued function $f : \Re^n \rightarrow V$, with pseudocode.	**10M**
	(b)	Suppose hypothesis h commits r = 10 errors over a sample of n = 65 independently drawn examples, then **solve** the following (i)What is the variance and standard deviation for number of true error rate $error_D(h)$? (ii)What is the 90% confidence interval (two-sided) for the true error rate? (iii)What is the 95% one-sided interval (i.e., what is the upper bound U such that $error_D(h) \leq 5$ U with 95% confidence)? (iv)What is the 90% one-sided interval?	**10M**
		OR	
Q.10	**(a)**	**What** is reinforcement learning and **develop** reinforcement learning problem with neat diagram**.**	**10M**
	(b)	**Interpret** the Q function and **Solve** Q Learning Algorithm assuming deterministic rewards and actions with an example.	**10M**

α	0.100	0.050	0.025	0.001
$1-\alpha$	0.900	0.950	0.975	0.999
$z_{1-\alpha}$	1.28	1.64	1.96	3.09

Table showing the Bloom's Taxonomy Level, Course Outcome and Programme Outcome				
Question		**Bloom's Taxonomy Level attached**	**Course Outcome**	**Programme Outcome**
Q.1	(a)	L2	CO1	PO1
	(b)	L2	CO1	PO1
Q.2	(a)	L2	CO1	PO2
	(b)	L2	CO1	PO2
Q.3	(a)	L1	CO2	PO3
	(b)	L3	CO2	PO3
Q.4	(a)	L1	CO1	PO3
	(b)	L3	CO2	PO3
Q.5	(a)	L2	CO3	PO3
	(b)	L2	CO3	PO4
Q.6	(a)	L2	CO3	PO5
	(b)	L2	CO3	PO6
Q.7	(a)	L2	CO3	PO9
	(b)	L2	CO3	PO12
	(c)	L3	CO3	PO5
Q.8	(a)	L3	CO3	PO6
	(b)	L2	CO3	PO9
	(c)	L3	CO3	PO9
Q.9	(a)	L3	CO4	PO9
	(b)	L3	CO4	PO4
Q.10	(a)	L3	CO4	PO5
	(b)	L3	CO4	PO12

Bloom's Taxonomy Levels	**Lower order thinking skills**		
	Remembering(knowledge):L_1	Understanding Comprehension): L_2	Applying (Application): L_3
	Higher order thinking skills		
	Analyzing (Analysis): L_4	Valuating (Evaluation): L_5	Creating (Synthesis): L_6