

Roll No.....

Enrolment No.....

JAMIA HAMDARD
School of Engineering Sciences and Technology
Department of Computer Science & Engineering

Odd Semester Examination - 2022

Subject: Machine Learning (DE-1)

Subject Code: BTCSE - DED13

TIME: 3 Hours

MAX. MARKS: 75

Note: 1) Immediately write your Roll No. and Enrolment No. after receiving the Question Paper.

2) Do not write anything on the Question Paper.

3) Scientific Calculator is Allowed without Memory Feature.

4) Please follow proper numbering while answering the questions.

SECTION – A (35 Marks)

❖ **Attempt ALL questions. Each question is of 5 marks.**

Q. No.	Questions	CO*	BL*																																																																																																																																																																																
1.	Point wise differentiate between Machine Learning, Artificial Intelligence and Deep Learning.	CO1	L1, L2																																																																																																																																																																																
2.	Explain the different methods that can be used to handle the class imbalance problem.	CO2	L2, L3																																																																																																																																																																																
3.	Using neat diagrams show that basic AND, OR, NAND and NOR are linearly separable, while EXOR is not.	CO5	L4, L5																																																																																																																																																																																
4.	A manufacturer claims that the thickness of the spearmint gum it produces is 7.5 one-hundredths of an inch. A quality control specialist regularly checks this claim. On one production run, he took a random sample of $n=10$ pieces of gum and measured their thickness. He obtained: 7.65, 7.60, 7.65, 7.70, 7.55, 7.55, 7.40, 7.40, 7.50, and 7.50. Test the claim of the manufacturer with 95% confidence. Note: Use standard deviation of the sample for this question. <table><tr><th></th><th>.40</th><th>.25</th><th>.10</th><th>.05</th><th>.025</th><th>.01</th><th>.005</th><th>.0025</th><th>.001</th><th>.0005</th></tr><tr><td>1</td><td>.325</td><td>1.000</td><td>3.078</td><td>6.314</td><td>12.706</td><td>31.821</td><td>63.657</td><td>127.32</td><td>318.31</td><td>636.62</td></tr><tr><td>2</td><td>.289</td><td>.816</td><td>1.886</td><td>2.920</td><td>4.303</td><td>6.965</td><td>9.925</td><td>14.089</td><td>23.326</td><td>31.598</td></tr><tr><td>3</td><td>.277</td><td>.765</td><td>1.638</td><td>2.353</td><td>3.182</td><td>4.541</td><td>5.841</td><td>7.453</td><td>10.213</td><td>12.924</td></tr><tr><td>4</td><td>.271</td><td>.741</td><td>1.533</td><td>2.132</td><td>2.776</td><td>3.747</td><td>4.604</td><td>5.598</td><td>7.173</td><td>8.610</td></tr><tr><td>5</td><td>.267</td><td>.727</td><td>1.476</td><td>2.015</td><td>2.571</td><td>3.365</td><td>4.032</td><td>4.773</td><td>5.893</td><td>6.869</td></tr><tr><td>6</td><td>.265</td><td>.718</td><td>1.440</td><td>1.943</td><td>2.447</td><td>3.143</td><td>3.707</td><td>4.317</td><td>5.208</td><td>5.959</td></tr><tr><td>7</td><td>.263</td><td>.711</td><td>1.415</td><td>1.895</td><td>2.365</td><td>2.998</td><td>3.499</td><td>4.029</td><td>4.785</td><td>5.408</td></tr><tr><td>8</td><td>.262</td><td>.706</td><td>1.397</td><td>1.860</td><td>2.306</td><td>2.896</td><td>3.355</td><td>3.833</td><td>4.501</td><td>5.041</td></tr><tr><td>9</td><td>.261</td><td>.703</td><td>1.383</td><td>1.833</td><td>2.262</td><td>2.821</td><td>3.250</td><td>3.690</td><td>4.297</td><td>4.781</td></tr><tr><td>10</td><td>.260</td><td>.700</td><td>1.372</td><td>1.812</td><td>2.228</td><td>2.764</td><td>3.169</td><td>3.581</td><td>4.144</td><td>4.587</td></tr><tr><td>11</td><td>.260</td><td>.697</td><td>1.363</td><td>1.796</td><td>2.201</td><td>2.718</td><td>3.106</td><td>3.497</td><td>4.025</td><td>4.437</td></tr><tr><td>12</td><td>.259</td><td>.695</td><td>1.356</td><td>1.782</td><td>2.179</td><td>2.681</td><td>3.055</td><td>3.428</td><td>3.930</td><td>4.318</td></tr><tr><td>13</td><td>.259</td><td>.694</td><td>1.350</td><td>1.771</td><td>2.160</td><td>2.650</td><td>3.012</td><td>3.372</td><td>3.852</td><td>4.221</td></tr><tr><td>14</td><td>.258</td><td>.692</td><td>1.345</td><td>1.761</td><td>2.145</td><td>2.624</td><td>2.977</td><td>3.326</td><td>3.787</td><td>4.140</td></tr><tr><td>15</td><td>.258</td><td>.691</td><td>1.341</td><td>1.753</td><td>2.131</td><td>2.602</td><td>2.947</td><td>3.286</td><td>3.733</td><td>4.073</td></tr></table>		.40	.25	.10	.05	.025	.01	.005	.0025	.001	.0005	1	.325	1.000	3.078	6.314	12.706	31.821	63.657	127.32	318.31	636.62	2	.289	.816	1.886	2.920	4.303	6.965	9.925	14.089	23.326	31.598	3	.277	.765	1.638	2.353	3.182	4.541	5.841	7.453	10.213	12.924	4	.271	.741	1.533	2.132	2.776	3.747	4.604	5.598	7.173	8.610	5	.267	.727	1.476	2.015	2.571	3.365	4.032	4.773	5.893	6.869	6	.265	.718	1.440	1.943	2.447	3.143	3.707	4.317	5.208	5.959	7	.263	.711	1.415	1.895	2.365	2.998	3.499	4.029	4.785	5.408	8	.262	.706	1.397	1.860	2.306	2.896	3.355	3.833	4.501	5.041	9	.261	.703	1.383	1.833	2.262	2.821	3.250	3.690	4.297	4.781	10	.260	.700	1.372	1.812	2.228	2.764	3.169	3.581	4.144	4.587	11	.260	.697	1.363	1.796	2.201	2.718	3.106	3.497	4.025	4.437	12	.259	.695	1.356	1.782	2.179	2.681	3.055	3.428	3.930	4.318	13	.259	.694	1.350	1.771	2.160	2.650	3.012	3.372	3.852	4.221	14	.258	.692	1.345	1.761	2.145	2.624	2.977	3.326	3.787	4.140	15	.258	.691	1.341	1.753	2.131	2.602	2.947	3.286	3.733	4.073	CO5	L4, L5
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5.	A restaurant sells burgers with optional flavors: Pepper, Ginger, Chilly and Spicy. Every day this week you have tried a burger and kept a record of which you liked. Using Hamming distance, show how the KNN ($K=3$) classifier with majority voting would classify {Pepper: false, Ginger: true, Chilly: true, Spicy: false} <table><tr><th>Day</th><th>Pepper</th><th>Ginger</th><th>Chilly</th><th>Spicy</th><th>Liked</th></tr><tr><td>Monday</td><td>True</td><td>True</td><td>True</td><td>True</td><td>Yes</td></tr><tr><td>Tuesday</td><td>False</td><td>False</td><td>True</td><td>True</td><td>Yes</td></tr><tr><td>Wednesday</td><td>False</td><td>True</td><td>False</td><td>False</td><td>No</td></tr><tr><td>Thursday</td><td>False</td><td>True</td><td>True</td><td>True</td><td>No</td></tr><tr><td>Friday</td><td>True</td><td>False</td><td>False</td><td>False</td><td>Yes</td></tr><tr><td>Saturday</td><td>True</td><td>False</td><td>True</td><td>True</td><td>No</td></tr><tr><td>Sunday</td><td>True</td><td>True</td><td>False</td><td>False</td><td>Yes</td></tr></table>	Day	Pepper	Ginger	Chilly	Spicy	Liked	Monday	True	True	True	True	Yes	Tuesday	False	False	True	True	Yes	Wednesday	False	True	False	False	No	Thursday	False	True	True	True	No	Friday	True	False	False	False	Yes	Saturday	True	False	True	True	No	Sunday	True	True	False	False	Yes	CO5	L3, L4, L5																																																																																																																																
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6.	Define Artificial Neural Network and Mention what you can and cannot do with an ANN.	CO2	L2, L3																																																																																																																																																																																

7.	Differentiate between Supervised Learning, Unsupervised Learning and Reinforcement Learning with proper examples.	CO1	L1, L2
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SECTION – B (40 Marks)

❖ Attempt any **FOUR** questions. Each question is of **10 marks**.

Q. No.	Questions	CO*	BL*
1.	What do you understand by Data Preprocessing? Explain the following terms with suitable examples: a) Data Cleaning b) Data Integration c) Data Transformation d) Data Reduction	CO1	L1, L2, L3
2.	What is the need for classification? Explain logistic regression with example and also derive all the gradient descent equations for computing the parameters of logit function.	CO3	L3, L4
3.	Explain the following terms with examples: a) Karl Pearson's Coefficient of Correlation b) Confusion Matrix		

CO* - Course Outcomes from Syllabus, BL* - Bloom's Taxonomy Levels (1: Remembering, 2: Understanding, 3: Applying, 4: Analyzing, 5: Evaluating, 6: Creating)

END