



PRESIDENCY UNIVERSITY

BENGALURU

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End - Term Examinations – May / June 2026

Date: 27-05-2026

Time: 01:00pm – 04:00pm

School: SOCSE	Program: B.Tech	
Course Code: ADS1705	Course Name: Explainable AI	
Semester: VI	Max Marks: 100	Weightage: 50%

CO - Levels	C01	C02	C03	C04
Marks	44	44	46	46

Instructions:

- (i) Read all questions carefully and answer accordingly.
- (ii) Do not write anything on the question paper other than roll number.

Part A

Answer ALL the Questions. Each question carries 2marks.

10Q x 2M=20M

1.	List out pros & cons of post-hoc explainable AI.	2 Marks	L1	C01
2.	Define local explainability in XAI with an example.	2 Marks	L1	C01
3.	List out the key characteristics of interpretable models.	2 Marks	L1	C02
4.	Describe the components of decision tree classifier.	2 Marks	L1	C02
5.	Define the following terms with respect to neural networks. a) Forward propagation b) Backpropagation	2 Marks	L1	C03
6.	Describe the importance of weights in neural network.	2 Marks	L1	C03
7.	Define integrated gradient method in XAI.	2 Marks	L1	C03
8.	Define intuition-based explanation in XAI.	2 Marks	L1	C04
9.	List out any two applications of XAI in finance domain.	2 Marks	L1	C04
10.	Discuss anomaly detection in cybersecurity?	2 Marks	L1	C04

Part B

Answer the Questions.

Total Marks 80M

11.	a.	Explain any 4 types of intrinsic methods in Explainable AI with ab real-time example?	10 Marks	L2	CO1
	b.	An email system uses an AI model to classify emails as spam or not spam. Explain the working steps of Explainable Artificial Intelligence (XAI) used to justify why a particular email is marked as spam.	10 Marks	L2	CO1
Or					
12.	a.	Explain sub-domains of artificial intelligence in detail with real-time examples?	10 Marks	L2	CO1
	b.	Examine different types of explainable AI methods with suitable examples	10 Marks	L2	CO1

13.	a.	Demonstrate the working of Shapley Additive Explanations (SHAP) in detail with a real-time example?	10 Marks	L2 2	CO2																												
	b.	A bank wants to predict whether a customer will Approve a Loan (Yes/No) based on the attributes Credit Score and Employment Status. <table><tr><th>Credit Score</th><th>Employment Status</th><th>Yes</th><th>No</th></tr><tr><td>Good</td><td>Employed</td><td>5</td><td>1</td></tr><tr><td>Good</td><td>Unemployed</td><td>2</td><td>3</td></tr><tr><td>Average</td><td>Employed</td><td>4</td><td>2</td></tr><tr><td>Average</td><td>Unemployed</td><td>1</td><td>4</td></tr><tr><td>Poor</td><td>Employed</td><td>2</td><td>3</td></tr><tr><td>Poor</td><td>Unemployed</td><td>1</td><td>5</td></tr></table> Tasks: 1. Calculate the overall Gini Index of the dataset. 2. Compute the Gini Index for splitting on Credit Score. 3. Compute the Gini Index for splitting on Employment Status. 4. Calculate the Weighted Gini Index for both attributes. 5. Identify the best attribute for the root node based on Gini Index. <td>10 Marks</td> <td>L3</td> <td>CO2</td>	Credit Score	Employment Status	Yes	No	Good	Employed	5	1	Good	Unemployed	2	3	Average	Employed	4	2	Average	Unemployed	1	4	Poor	Employed	2	3	Poor	Unemployed	1	5	10 Marks	L3	CO2
Credit Score	Employment Status	Yes	No																														
Good	Employed	5	1																														
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Average	Unemployed	1	4																														
Poor	Employed	2	3																														
Poor	Unemployed	1	5																														
Or																																	

14.	a.	Demonstrate the working of bagging & boosting with a neat diagram with relevant examples	10 Marks	L2	CO2
	b.	Explain LIME in Explainable AI and how does it help in explaining model predictions in detail with suitable example.	10 Marks	L2	CO2

15.	a.	A hospital uses MRI scans to detect brain tumors. An AI system based on Convolutional Neural Networks (CNN) is applied to analyze the images. Explain how the CNN processes the MRI images step-by-step to identify and classify the tumor.	10 Marks	L2	CO3
	b.	By considering scenario of question 15a, explain how you will apply Grad-CAM on the MRI scans in order to interpret the output.	10 Marks	L2	CO3

Or

16.	a.	Explain the following techniques with respect to gradient based explanations in XAI. a) Saliency Maps b) Integrated Gradient	10 Marks	L2	CO3																								
	b.	A perceptron is used to classify whether a transaction is Fraud (1) or Not Fraud (0) based on three input features: x_1, x_2 & x_3. Initial weights: $w_1 = 0.1$, $w_2 = -0.2$, $w_3 = 0.05$ Bias: $b = 0.3$ Learning rate: $\eta = 0.1$ <table><thead><tr><th>x_1</th><th>x_2</th><th>x_3</th><th>Target (t)</th></tr></thead><tbody><tr><td>1</td><td>0</td><td>1</td><td>1</td></tr><tr><td>0</td><td>1</td><td>1</td><td>0</td></tr><tr><td>1</td><td>1</td><td>0</td><td>1</td></tr><tr><td>0</td><td>0</td><td>1</td><td>0</td></tr><tr><td>1</td><td>0</td><td>0</td><td>1</td></tr></tbody></table> Perform the forward propagation and identify the final output.	x_1	x_2	x_3	Target (t)	1	0	1	1	0	1	1	0	1	1	0	1	0	0	1	0	1	0	0	1	10 Marks	L3	CO3
x_1	x_2	x_3	Target (t)																										
1	0	1	1																										
0	1	1	0																										
1	1	0	1																										
0	0	1	0																										
1	0	0	1																										

17.	a.	A social network uses a Graph Neural Network (GNN) to detect fake accounts. To understand why a particular account is classified as fake, a GNN Explainer is applied. Explain how GNN Explainer identifies the important nodes, edges, and features responsible for the prediction.	10 Marks	L2	CO4
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	b.	A fraud detection system uses a Graph Neural Network (GNN) to identify suspicious transactions. To explain why a particular transaction is classified as fraud, a PG Explainer is applied. Explain how PG Explainer identifies the important subgraph and features responsible for the prediction.	10 Marks	L2	CO4
Or					
18.	a.	A doctor uses an AI system to diagnose a disease, but instead of technical details, the system explains the result using human-like reasoning (intuition). Explain how intuition-based explanations in Explainable AI (XAI) help the doctor understand the prediction.	10 Marks	L2	CO4
	b.	An AI system is used to classify medical images, and it explains its predictions using high-level concepts like 'tumor shape' and 'tissue density' instead of raw pixels. Explain how concept-based explanations in Explainable AI (XAI) help users understand the model's decision.	10 Marks	L2	CO4