

Faculty of Engineering

End Semester Examination May 2025

CS3EL15 Machine Learning

Programme	:	B.Tech.	Branch/Specialisation	:	CSE All
Duration	:	3 hours	Maximum Marks	:	60

Note: All questions are compulsory. Internal choices, if any, are indicated. Assume suitable data if necessary.
 Notations and symbols have their usual meaning.

Section 1 (Answer all question(s))				Marks CO BL
Q1. Which of the following is not a supervised learning?				1 1 1
<input type="radio"/> Naive Bayesian		<input checked="" type="radio"/> PCA		
<input type="radio"/> Linear Regression		<input type="radio"/> Decision Tree		
Q2. Data used to build a data mining model-				1 1 1
<input type="radio"/> Validation data		<input checked="" type="radio"/> Training Data		
<input type="radio"/> Testing Data		<input type="radio"/> Hidden Data		
Q3. Which of the following is NOT a component of learning in ML?				1 1 1
<input type="radio"/> Data		<input type="radio"/> Model		
<input type="radio"/> Performance Measure		<input checked="" type="radio"/> Graphics Card		
Q4. Regularization helps in reducing-				1 1 1
<input type="radio"/> Bias		<input type="radio"/> Data size		
<input checked="" type="radio"/> Variance		<input type="radio"/> Model interpretability		
Q5. What is the main advantage of using KNN for classification?				1 1 1
<input type="radio"/> High computational efficiency		<input checked="" type="radio"/> No training phase required		
<input type="radio"/> Works best with small datasets		<input type="radio"/> Requires fewer features		
Q6. The decision tree algorithm is most prone to which problem?				1 2 1
<input type="radio"/> Underfitting		<input checked="" type="radio"/> Overfitting		
<input type="radio"/> Missing values		<input type="radio"/> Feature selection		
Q7. Which of the following activation functions is most commonly used in hidden layers of deep neural networks?				1 1 1
<input type="radio"/> Sigmoid		<input checked="" type="radio"/> ReLU		
<input type="radio"/> Tanh		<input type="radio"/> Softmax		
Q8. What is the main goal of backpropagation in neural networks?				1 1 1
<input type="radio"/> To increase the number of hidden layers		<input checked="" type="radio"/> To minimize the loss function by updating weights		
<input type="radio"/> To remove unnecessary neurons		<input type="radio"/> To convert input data into a different format		
Q9. In reinforcement learning, what does the agent interact with-				1 2 1
<input checked="" type="radio"/> Environment		<input type="radio"/> Dataset		
<input type="radio"/> Hidden layers		<input type="radio"/> Loss function		

Q10. What is the main goal of boosting?

1 2 1

To reduce bias

To decrease training time

To select important features

To handle missing values

Section 2 (Answer all question(s))

Q11. Explain types of Machine Learning and its application.

Marks CO BL
2 1 1

Rubric	Marks
Explain types of Machine Learning and Application	2

Q12. Explain the concept of cost function in regression models. How to reduce it?

3 3 3

Rubric	Marks
Explain the concept of cost function in regression models. How to reduce it?	3

Q13. (a) Given a dataset with the following points (1,2), (2,3), (3,6), (4,8), compute the equation of the best-fit line using Linear Regression.

5 3 1

Rubric	Marks
Given a dataset with the following points (1,2), (2,3), (3,6), (4,8), compute the equation of the b	5

(OR)

(b) Compare linear regression and logistic regression.

Rubric	Marks
Compare linear regression and logistic regression.	5

Section 3 (Answer all question(s))

Marks CO BL
3 4 1

Q14. What is regularization? How does it help in machine learning?

Rubric	Marks
What is regularization? How does it help in machine learning?	3

Q15. (a) Explain how kernel methods improve the performance of SVM.

7 2 1

Rubric	Marks
Explain how kernel methods improve the performance of SVM.	7

(OR)

(b) Explain the working of decision trees with an example.

Rubric	Marks
Explain the working of decision trees 4 with an example. 3	7

Section 4 (Answer all question(s))

Marks CO BL
2 2 1

Q16. What is clustering in unsupervised learning?

Rubric	Marks
What is clustering in unsupervised learning?	2

Q17. (a) Explain the role of matrix completion in machine learning.

8 2 1

Rubric	Marks
Explain the role of matrix completion in machine learning.	8

(OR)

(b) Define Principal Component Analysis (PCA) and its significance.

Rubric	Marks
Define Principal Component Analysis (PCA) and its significance.	8

Section 5 (Answer all question(s))

Marks CO BL

4 2 1

Q18. Define a perceptron. Explain its working with an example.

Rubric	Marks
Define a perceptron. Explain its working with an example.	4

Q19. (a) Explain the concepts of chain rules in backpropagation with example.

6 3 1

Rubric	Marks
Explain the concepts of chain rules in backpropagation with example.	6

(OR)

(b) What is a Recurrent Neural Network (RNN)? How does it differ from a feedforward network?

Marks CO BL

5 1 1

Rubric	Marks
What is a Recurrent Neural Network (RNN)? How does it differ from a feedforward network?	6

Section 6 (Answer any 2 question(s))

Q20. What are the advantages and disadvantages of ensemble learning?

Marks CO BL

5 1 1

Rubric	Marks
What are the advantages and disadvantages of ensemble learning?	5

Q21. What is the working principle of the Random Forest algorithm?

5 4 1

Rubric	Marks
What is the working principle of the Random Forest algorithm?	5

Q22. Explain the concept of Deep Learning. How it is differed from Machine Learning?

5 4 1

Rubric	Marks
Definition of Deep Learning and difference.	5
