



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))

Marks CO BL

Q11. Explain types of Machine Learning and its application.

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

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

3 4 1

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

Q16. What is clustering in unsupervised learning?

2 2 1

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

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

4 2 1

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?

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))

Marks CO BL

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

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
