

Roll No. \_\_\_\_\_

# Pandit Deendayal Energy University

IA1,  
B. Tech. (ICT-19)  
Semester - VI

Date: 16/02/2022,  
Time: 9.30AM to 11 AM

Course Name: Machine Learning

Course Code: 20IC313T

Max. Marks: 30

## Instructions:

1. All questions have two choices. Attempt any one choice from each question. Both (a) and (b) must be from one particular choice only.
2. Answers must be to the point and clear.
3. Write your Name and Roll No on every page (on top position) and your signature in every bottom of the page.
4. Provide clear scan copy of your Ans sheets in a single pdf file.

Question No.	Question Description	Unit	Marks	Course Outcome (CO)
Q.1	(a) What are the various use cases of Machine learning algorithms?  (b) Discuss each use case with an example.	1	5+5=10	CO1
OR				
Q.1	(a) Explain the type of learning in machine learning using real world applications.  (b) Explain over fitting, under fitting and good prediction based on Bias and Variance using appropriate example.	1	5+5=10	CO1
Q.2	(a) How linear regression helps in prediction of an unknown value with respect to an unseen input? Explain with real world example.  (b) Show that optimum value of a hypothesis $H=aX + b$ can be find in a convex search space of a cost function $C=1/2m \sum_{i=1}^m (H_i - y_i)^2$ for a linear regression problem.	1	5+5=10	CO2
OR				
Q.2	(a) How the “Batch Gradient Descent” and “Stochastic Gradient Descent” are different explain with suitable example.	1	5+5=10	CO2

	(b) Show that the Newton's method converges fast w.r.t. Gradient Descent and also explain its limitations.			
Q.3	<p>(a) What is the necessary condition to find a minima in a convex function? Explain why it is not valid for a function <math>f(x)=x^3</math>. What is the sufficient condition to obtain global minima of this function?</p> <p>(b) Derive the gradient descent algorithm to optimize a convex function. Consider a linear regression for this derivation.</p>	1	5+5=10	CO2
<b>OR</b>				
Q.3	<p>(a) Compare feature selection and dimensionality reduction. Also, discuss the importance of Eigen faces in face detection in AI.</p> <p>(b) Given in the figure below are three possible projections of mean vectors <math>\mu_1</math> and <math>\mu_2</math> for the two classes <math>c_1</math> and <math>c_2</math>, with <math>N_1</math> and <math>N_2</math> points. Explain which projection is the best case with proper justification.</p>	1	5+5=10	CO2

