Name: **Enrolment No:**	

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, September 2022

Programme Name: B Tech (Mechatronics) **Semester : III**
Course Name : Applied Machine Learning
Time : 03 hrs
Course Code : MECH 2040 **Max. Marks: 100**
Nos. of page(s) : 2
Instructions:

SECTION A
ALL QUESTIONS ARE COMPULSORY.

S. No.		Marks	CO
Q 1	Explain Logistic Regression with its mathematical form.	**4**	**2**
Q 2	Explain learning processes of machines with or without supervision.	**4**	**1**
Q 3	Explain about R-squared (multiple and adjusted), confusion matric and precision.	**4**	**2**
Q 4	Describe any two useful applications of machine learning.	**4**	**1**
Q 5	Explain the conditions to reject null hypothesis as well as to accept alternative hypothesis through *p-value* and slope.	**4**	**2**

SECTION B

ALL QUESTIONS ARE COMPULSORY. ATTEMPT ANY ONE FROM Q6

S. No.		Marks	CO
Q 6	Explain the usefulness of following python libraries with their python syntax: a. keras b. tensor c. scipy d. OpenCV e. matplotlib **OR** Explain HSV/HSL and its all four components.	**10**	**2**
Q 7	Explain five benefits of neural network.	**10**	**2**

Q 8	Explain about lossless and lossy Compression.	**10**	**3**
Q 9	Explain neural model and their equations, and components with model diagram.	**10**	**3**
	SECTION-C **ALL QUESTIONS ARE COMPULSORY. ATTEMPT ANY ONE FROM Q10**		
Q 10	Build python code to convert HSV to RGB from scratch. **OR** Build Image classification model using CNN on 28X28 image	**20**	**3**
Q 11	I. Answer following questions based on model summary analysis shown in Fig. 1: a. Name the list of predictors, response and number of observations used for generating model' summary in Fig. 2 (2) b. Is the given formula belong to simple or multiple linear regression? Explain your observations? (4) c. Is there any relationship between predictor and responses? Why or why not? (2) d. Determine the strength of relationship between the predictor and the response and how? (6) e. Which type of relationship (either positive or negative) you observed between the predictor and the response? (6)	**20**	**2,3**

OLS Regression Results

Dep. Variable:	Sales	**R-squared:**	0.897
Model:	OLS	**Adj. R-squared:**	0.896
Method:	Least Squares	**F-statistic:**	570.3
Date:	Wed, 14 Sep 2022	**Prob (F-statistic):**	1.58e-96
Time:	11:57:02	**Log-Likelihood:**	-386.18
No. Observations:	200	**AIC:**	780.4
Df Residuals:	196	**BIC:**	793.6
Df Model:	3		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
Intercept	2.9389	0.312	9.422	0.000	2.324	3.554
TV	0.0458	0.001	32.809	0.000	0.043	0.049
Radio	0.1885	0.009	21.893	0.000	0.172	0.206
Newspaper	-0.0010	0.006	-0.177	0.860	-0.013	0.011

Fig. 1