Machine Learning Assignment-I

1. Car Plant Electricity Usage: The manager of a car plant wishes to investigate how the plant's electricity usage depends upon the plant's production.

	Production ($ million)	Electricity usage (million kWh)
January	4.51	2.48
February	3.58	2.26
March	4.31	2.47
April	5.06	2.77
May	5.64	2.99
June	4.99	3.05
July	5.29	3.18
August	5.83	3.46
September	4.70	3.03
October	5.61	3.26
November	4.90	2.67
December	4.20	2.53

FIGURE 12.5 ●
Car plant electricity usage data set

a) Find the regression line.

b) How much electricity usage for the production of $6.25 (millions)

2. The values of y and their corresponding values of y are shown in the table below

x	0	1	2	3	4
y	2	3	5	4	6

a) Find the regression line y = a x + b.
b) Estimate the value of y when x = 10.

3. The sales of a company (in million dollars) for each year are shown in the table below.

x (year)	2005	2006	2007	2008	2009
y (sales)	12	19	29	37	45

a) Find the regression line y = a x + b.
b) Use the regression line as a model to estimate the sales of the company in 2012.

4. Consider an object recognition system to classify objects in an image as cats or dogs. The system takes an image with 19 dogs and some cats as input, and predicted 17 dogs. These were actually 13 cats among 17 predicted dogs. What is the precision of the system?
Ans- 4/17

5. Given the confusion matrix, find: Classification Accuracy, Recall, Precision, F-measure.

N=165	**Predicted: No**	**Predicted: Yes**	
Actual: No	Tn=50	Fp=10	60
Actual: Yes	Fn=5	Tp=100	105
	55	110	

6. An art competition has entries for three painters: Vipin, Rohit and Ajay.

- Vipin put in 15 paintings, 4% of his works have won First Prize.
- Rohit put in 5 paintings, 6% of his works have won First Prize.
- Ajay put in 10 paintings, 3% of his works have won First Prize.

What is the chance that Vipin will win First Prize?

Bayes' Theorem is a way of finding a probability when we know certain other probabilities.

7. Consider the following training record.

Tid	**Refund**	**Marital Status**	**Taxable Income**	**Evade**
1	Yes	Single	125K	No
2	No	Married	100K	No
3	No	Single	70K	No
4	Yes	Married	120K	No
5	No	Divorced	95K	Yes
6	No	Married	60K	No

7	Yes	Divorced	220K	No
8	No	Single	85K	Yes
9	No	Married	75K	No
10	No	Single	90K	Yes

Given a new instance X=(Refund=No, Married, Income=120K),
Predict whether the Evade is Yes or No using KNN Algo

8. Apply KNN classification algorithm to the following data and predict value for (10,7) for K = 3

Feature 1	Feature 2	Class
1	1	A
2	3	A
2	4	A
5	3	A
8	6	B
8	8	B
9	6	B
11	7	B

Q.9 Apply KNN algorithm and predict type of fruits Tomato (sweet-6, chrunch-4) belongs-

Ingredient	sweet	Chrunch	Food Type
Grapes	8	5	Fruit
Greenbeen	3	7	Vegetable
Nuts	3	6	Protein
Orange	7	3	Fruit