V.P. & R.P.T.P. Science College, Vallabh Vidyanagar
B.Sc. Semester IV
Internal Test
Foundation of Statistics - II
Course Code: US04FSTA01

Date: 6th March, 2017
Time: 3. 00 to 4. 00 p.m

Marks: 25

Note: (i) Simple/Scientific calculator is allowed (ii) Q.3 to Q.5 has 6 marks.

Q.1 Multiple Choice Questions   (3 × 1)
(1) The regression line of X on Y is used to predict the value of
     (a) X (b) Y (c) Both X and Y (d) None of these
(2) Consider the following probability distribution the value of $P(X > 3) =$ _____

$$P(X = x) = \binom{10}{x}\left(\frac{1}{3}\right)^x \left(\frac{2}{3}\right)^{10-x}, x = 0, 1, \dots 10$$

     (a) 0.5593   (b) 0.2991   (c) 0.4407   (d) 0.7009
(3) When testing for independence in a contingency table with 4 rows and 4 columns, there are _____ degrees of freedom
     (a) 7   (b) 8   (c) 9   (d) 10

Q.2 Short Type Questions (Attempt Any Two)   (2 × 2)
(a) Write down the regression equation which could be used to estimate the value of X for any given values of Y. Write down the formulae to calculate each term in the equation.
(b) Define Poisson distribution. State its parameter, mean and standard deviation. Give two practical situations where Poisson distribution is used.
(c) Write in brief on chi square test in a 2 × 2 contingency table.

Q.3 (a) Write a note on Spearman's rank correlation coefficient method.
    (b) The Body Weight (BW) and Resting Metabolic Rate (RMR) of 10 patients who admitted in the hospital are given below:

Body weight(kg)	57.6	64.9	59.2	60.0	72.8	77.1	82.0	86.2	91.6	99.8
RMR(kcal/24 hrs)	1325	1365	1342	1316	1382	1439	1536	1466	1519	1639

(i) Is there any relationship between these two variables? Justify your answer by calculating most suitable statistical measure. Comment on your findings (ii) Predict the RMR of a patient whose body weight is 70kg.

OR

Q.3 (a) What is regression? State its uses. Write down the properties of regression coefficients.
    (b) An experiment is carried out at different temperatures dissolving 100 gm of salt in 100 ml of water. The results are as under:

Temperature(^{0}C)	0	10	20	30	40	50	60	70
Weight of salt(gm)	88.0	83.4	71.6	66.2	62.8	57.7	55.0	53.1

(i) Is there any relationship between these two variables? Justify your answer by calculating suitable statistical measure (ii) At what temperature the weight of salt be 60 gm?

Q.4 (a) Define Binomial distribution. State its parameters, mean and standard deviation. Under which conditions Binomial distribution is used?
    (b) A medication gives 5% of the users an undesirable reaction. If a sample of 200 users receives the medication, find the prob. of (i) at least 2 (ii) exactly 2, will have undesirable reactions.

OR

Q.4 (a) A test consists of 20 multiple choice questions, each with three possible answers, one of which is correct. To pass the test a student must get 60% or better on the test. If a student randomly guesses, what is the probability that the student will pass the test?
    (b) Let X be a Poisson variate with mean 2.4. Find (i) $P(X > 2)$ (ii) $P(X = 0)$ (iii) $P(X \geq 3)$

Q.5 Among the 144 individuals who had experience myocardial infarction (Heart attack), 46 were diagnosed with diabetes; among 144 individuals who were free of heart disease, only 25 suffered from diabetes. (i) Present the above data in a two – way frequency table (ii) Is there any association between diabetes and occurrence of myocardial infraction?

OR

Q.5 1000 families were selected at random in a city to study an association between Economical condition at home and Type of schooling.

Economical Condition	Type of Schooling		Total
	Private	Govt.	
Low	370	430	800
High	130	70	200
Total	500	500	1000

Carry out an appropriate statistical test and comment on your findings.