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

Monday, 12th March, 2018

Duration: 1 hour

Marks: 25

Note: (i) Simple/Scientific calculator is allowed (ii) Statistical table will be allowed/provided on request.
(iii) Q.3 to Q.4, Each sub question has 3 marks. (iv) Q.5 is of marks 6.

Q.1 Multiple Choice Questions (1×3)

(1) Which of the following is not true?
(a) $r = \pm\sqrt{b_{XY} \times b_{YX}}$ (b) $b_{XY} = r\frac{s_X}{s_Y}$ (c) $-1 \le r \le 1$ (d) two regression lines do not intersect

(2) Let $X \sim b(12, 0.15)$ then $P(X \ge 4) =$ _____
(a) 0.9078 (b) 0.9761 (c) 0.9957 (d) 0.0922

(3) Which of the following values cannot occur in a chi square distribution?
(a) 2.25 (b) -3.01 (c) 11.74 (d) 51.12

Q.2 Short Type Questions (Attempt Any Two) (2×2)

(a) What is regression? Write down the regression equation which could be used to estimate the values of X for any given values of Y. Write down the formulae to calculate each term in the above equation.

(b) The probability that a patient will get reaction of a temiflu injection is 0.10. If 15 patients are given that injection, find the probability that 3 or more will get reaction from that injection.

(c) Write in brief on chi square test in a 2×2 contingency table.

Q.3 (a) Define Spearmen's correlation coefficient. State its limits. How is it different from correlation coefficient? Interpret the cases when $\rho = -1, 1$

(b) A random sample of seven drivers insured with a company and having similar auto insurance policies was selected. The following table lists their driver experiences (in years) and monthly auto insurance premiums (in dollars)

Driving Experience	5	2	12	9	15	6	25
Monthly Insurance Premiums	64	87	50	71	44	56	42

(i) Does the insurance premium depend on driving experience? Justify your answer by calculating most suitable statistical measure (ii) Predict the monthly auto insurance premium for driver with 12 years of driving experience.

OR

Q.3 (a) What is correlation coefficient? How will you calculate it? Write down its limits. Interpret the cases when $r = -1, 0, 1$

(b) A study was conducted on the amount of converted sugar (Y) in a certain process at various temperatures (X). The result are as under:

X	1.0	1.1	1.2	1.3	1.4	1.5	1.7	1.8	1.9	2.0
Y	8.1	7.8	8.5	9.8	9.5	8.9	10.2	9.3	9.2	1.5

(i) Is there any relationship between these two variables? Justify your answer by calculating a most suitable statistical measure (ii) Estimate the amount of converted sugar produced when the temperature is 1.67.

Q.4 (a) Define Binomial distribution. State the condition(s) under which Binomial distribution tends to Poisson distribution. Give some practical situations where Poisson distribution may be used.

(b) On a 20 multiple choice questions each of having four possible answers of which one is correct. If a student guesses randomly and independently, what is the probability that he/she is correct only on questions 1 and 4?

OR

Q.4 (a) A medication gives 5% of the users an undesirable reaction. If a sample of 120 users receives the medication, find the prob. of (i) at least 2 (ii) exactly 4 (iii) less than 3, will have undesirable reactions.

(b) Find $P(X = 3) and\ P(X > 3)$ if

$(i)\ P(X = x) = \binom{7}{x}\left(\frac{1}{3}\right)^x\left(\frac{2}{3}\right)^{7-x}, x = 0, 1, 2, \ldots 7$ $(ii)\ P(X = x) = \frac{e^{-1.2}(1.2)^x}{x!}, x = 0, 1, 2, \ldots\ldots$

Q.5 A survey amongst women was conducted to study the family life.

Education	Family life		Total
	Happy	Unhappy	
Educated	70	30	100
Uneducated	60	40	100
Total	130	70	200

Is there is any association between family life and education? Test at $\alpha = 0.05$.

OR

Q.5 In a certain sample of 2000 families 1400 families are consumers of tea. Out of 1800 hindu families 1236 families consume tea. Test whether "consumption of tea " and "community" are independent or not