

Date: 12th March, 2016

Time: 3.00 to 4.00 p.m

Marks: 25

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

Q.1 Multiple Choice Questions

(6 × 1)

(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) two regression lines do not intersect

(d) $-1 \leq r \leq 1$

(2) A test consists of 10 multiple choice questions, each with four possible answers, one of which is correct. To pass the test a student must get 40% or better on the test. If a student randomly guesses, what is the probability that the student will pass the test?

(a) 0.7759

(b) 0.1460

(c) 0.8540

(d) 0.2241

(3) What other name is used for a contingency table?

(a) A two way table

(b) A cross tabulation

(c) both (a) and (b)

(d) None of these

Q.2 Short Type Questions (Attempt Any Two)

(2 × 2)

(a) Write down the regression equation of X on Y and Y on X . State its uses. Do the two regression lines intersect? If yes, then at which point?

(b) Define Binomial distribution. State its parameters. Under which condition(s) Binomial distribution tends to Poisson distribution.

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

Q.3 (a) List out the various methods of studying correlation. According to you, which method do you considered to be best? Why?

(b) Hardik's parents recorded his height at various ages up to 84 months. Below is a record of the results:

Age (months)	36	48	60	72	84
Height (in inches)	35	38	41	43	45

(i) Identify an independent and dependent variable.

(ii) Construct a scatter plot and comment on it.

(iii) Calculate r , the correlation coefficient and comment on it.

OR

Q.3 (a) What is regression? How it is different from correlation? State the properties of regression coefficients.

(b) The following table gives the results of measurements of train resistance; X is the velocity in miles per hour, Y is the resistance in pounds per ton.

X	20	40	60	80	100	120
Y	5.5	9.1	14.9	22.8	33.3	46.0

Write down the regression equation which could be used to predict velocity given the resistances.

Predict velocity when resistance is 20 pounds per ton.

Q.4 (a) It was claimed that 1 out of 10 dentists recommend Colgate sensitive tooth paste to his patients in

sensitivity of teeth. Suppose that the claim is true. If 5 dentists are selected independently and at random. Let X be the no. of dentists who recommend Colgate sensitive paste to his/her patients. Name the distribution of X and state its mean and standard deviation.

Calculate (i) $P(X > 3)$ (ii) $P(X < 2)$

- (b) It is known that 2% of plants produced by a certain species of corn seed will be infertile. In a random sample of 100 such plants, what is the probability that (i) more than 5 (ii) less than 2 (iii) 3 or more plants be infertile?

OR

- Q.4 (a) Let X be a Poisson variate with mean 2. Determine the following probabilities:

(i) $P(X < 2)$ (ii) $P(X = 3)$ (iii) $P(X > 4)$

- (b) Only 40% of the people in a city feel that its mass transits system is adequate. If 12 persons are selected at random, find the probability that:

(i) Exactly 3 (ii) 2 or more (iii) less than 2, who feel that the system is adequate?

- Q.5 1000 families were selected at random in a city and the following results were obtained:

Income	Type of Schooling		Total
	Private	Govt.	
Low	270	215	485
Middle	100	215	315
High	130	70	200
Total	500	500	1000

Test whether income and type of schooling are independent or not? Test at $\alpha = 0.05$

OR

- Q.5 A survey was conducted to investigate whether alcohol consumption and smoking are related. The following information was compiled for 600 individuals:

	Smoker	Non - smoker	Total
Drinker	193	165	358
Non - drinker	89	153	242
Total	282	318	600

- (i) Identify the objective(s) of study (ii) Carry out an appropriate statistical test to study the said objective.

