Goa VidyaprasarakMandal's
Gopal Govind Poy Raiturcar College of Commerce and Economics
Ponda - Goa
B.Com. (Semester - IV) Examination, April 201

STATISTICAL TECHNIQUES

Duration: 2 hours **Marks: 80**

Instructions : i) Attempt all questions
ii) Figures to the right indicate full marks.

Q1. a) Distinguish between Positive and Negative Correlation. (3)

b) For a bivariate data, means of x and y are 65 and 67, standard deviation of x and y are 2.5 and 3.5 respectively. The coefficient of correlation is 0.6. Write the regression equation of x on y. Also obtain the best value of x when y = 80. (6)

c) Compute Spearman's coefficient of rank correlation from the following data

x	75	88	95	70	60	80	81	50
y	120	134	150	115	110	140	142	100

(7)

OR

Q1. x) Explain the concept of Regression. (3)

y) Calculate the coefficient of correlation by Karl Pearson's method from the following data:

x	5	9	13	17	21
y	12	20	25	33	35

(6)

z) Find the missing value from the following data

x	2	3	7	10	12	15
y	18	16	10	?	13	11

(7)

Q2. a) Define the terms i) Random experiment ii) Independent events (3)

b) Out of the numbers 1 to 120, one number is selected at random. What is the probability that it is divisible by 8 or 11? (6)

c) From the marks obtained by candidates in Accountancy and Statistics, compute Spearman's coefficient of rank correlation.

Marks in Accountancy	15	20	28	12	40	60	20	80
Marks in Statistics	40	30	50	30	20	10	30	60

(7)

OR

Q2. x) Explain i) mutually exclusive events ii) exhaustive events. (3)

y) A card is drawn at random from a well shuffled pack of cards. Find the probability that it is a diamond or a king. (6)

z) The following data based on 450 students are given for marks in English and Mathematics at a certain examination

Mean marks in English : 40
Mean marks in Mathematics : 48
Standard deviation of marks in English : 12
Variance of marks in Mathematics : 256
Sum of product of deviation of marks from their respective means :42075

Obtain the equations of the two regression lines and estimate the marks in Mathematics of the students who obtained 50 marks in English. (7)

Q3. a) Discuss the merits and demerits of the random sampling method. (3)

b) The probabilities that a boy fishing at a particular place will catch 5, 6, 7, 8 fish are 0.4, 0.3, 0.2, 0.1 respectively. What is the expected number of fish caught? (6)

c) The probability that an evening college student will graduate is 0.4. Determine the probability that out of 5 students a) none will graduate b) at least one will graduate. (7)

OR

Q 3. x) Write a short note on Stratified Sampling. (3)

y) A player plays a game where he can win ₹ 5000 with probability 0.6, win ₹ 2500 with probability 0.3 and lose ₹ 15000 with probability 0.1. What is his expected gain in one play of the game? (6)

z) Between the hours 2 p.m. and 4 p.m., the average number of phone calls per minute coming into the switchboard of a company is 2.35. Find the probability that during one particular minute there will be at most 2 phone calls. (Given $e^{-2.35} = 0.09537$) (7)

Q 4. a) If mean of a binomial distribution is 4 and variance is 3, find n, p and q. (3)

b) From a sample of 90 parts, 15 were found to be defective. Find 95% confidence interval for the population proportion of parts that are defective. (6)

c) The average test marks in a particular class are 79. Standard deviation is 5. If the marks are normally distributed, how many students in a class of 200 will get marks between 75 and 82?
(Area under the standard normal curve between i) t = 0 and t = 0.6 is 0.2257
ii) t = 0 and t = 0.8 is 0.2881) (7)

OR

Q4. x) For a Poisson distribution with $P(0) = e^{-2.25}$, find mean and standard deviation.(3)

y) A sample of 400 items is drawn from a population with sample mean 62.15 and standard deviation 10. Find 99% confidence interval for the mean of the population. (6)

z) A large consignment of tennis balls is assumed to have 20% substandard balls. A sample of 400 balls is selected from it. Find the probability that % of substandard balls in the sample is between 18% and 22%.
(Area under the standard normal curve between t = 0 and t = 1 is 0.3413) (7)

Q5. a) Explain a control chart with suitable diagrams. (3)

b) A pharmaceutical firm maintains that the mean time for a drug to take effect is 24minutes. In a sample of 400 trials, the mean time is 26 minutes with standard deviation of 4 minutes. Test the hypothesis that the mean time is 24 minutes against the alternative hypothesis that it is not 24 minutes. Use 1% level of significance. (6)

c) Construct a suitable control chart for the following data and write your conclusion

Sample Number (Each of 100 items)	1	2	3	4	5	6	7	8	9	10
Number of defectives	10	14	7	7	9	10	8	12	9	14

(7)

OR

Q 5. x) Write a note on Statistical Quality Control. (3)

y) A sales clerk in a departmental store claims that 60% of the shoppers entering the store leave without making a purchase. A random sample of 50 shoppers showed that 35 of them left without buying anything. Are these sample results consistent with the claim of the sales clerk? Use 5% level of significance. (6)

z) Eight samples of size 4 each are drawn. The mean ($\overline{X}$) and range (R) for each sample is given below. Draw the $\overline{X}$ – chart and comment.

Sample Number	1	2	3	4	5	6	7	8
Mean ($\overline{X}$)	13.5	2.51	1.80	2.39	1.48	2.11	1.50	1.71
Range (R)	0.3	0.5	0.4	0.6	0.3	0.7	0.5	0.4

(Given : A_2 for sample size 4 is 0.729) (7)

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