Goa VidyaprasarakMandal's
Gopal Govind Poy Raiturcar College of Commerce and Economics
Ponda -Goa
B.Com. (Semester - IV) Supplementary Examination, May/June 2018

STATISTICAL TECHNIQUES

Duration: 2 hours **Marks: 80**

INSTRUCTIONS : i) Attempt all questions.
ii) Figures to the right indicate full marks.
iii) Graph paper will be supplied on request.
iv) Use of non- programmable calculator is allowed.

Q 1. A. Give one point of difference between positive and negative correlation with one example each. (3)

Q 1. B. From the following data, find the regression equation of y on x and further estimate y when x = 18

x	10	13	15	23	43	50
y	45	42	57	60	65	79

(6)

Q 1. C. Calculate Spearman's rank correlation coefficient for the following data

x	42	40	52	57	36	42
y	102	100	105	103	110	105

(7)

OR

Q 1. X. If coefficient of correlation r = 0.5 and b_{yx} = 1.5, find b_{xy} (3)

Q 1. Y. Calculate the coefficient of correlation by Karl Pearson's method from the following data:

x	15	18	17	25	28	19
y	12	15	14	16	25	24

(6)

Q 1. Z. Find the missing value from the following data

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

(7)

Q 2. A. State Addition Theorem and Multiplication Theorem of probability. (3)

Q 2. B. A pair of dice is thrown. Find probability that the sum of the numbers on the uppermost face i) is six ii) is a two digit number. (6)

Q 2. C. Find Karl Pearson's Coefficient of correlation for following data between price and supply and comment on the result.

Price	2	5	8	10	6	3	1
Supply	4	6	7	8	5	4	3

(7)

OR

Q 2. X. Define Sample Space. Write the sample space for three coins tossed simultaneously (3)

Q 2. Y. Four cards are selected from a pack of 52 playing cards. Find the probability that i) all are black ii) only one is a king. (6)

Q 2. Z. The marks scored by 5 students in English and Hindi are given below.

Marks in English	85	90	40	60	73
Marks in Hindi	93	90	50	75	65

Calculate rank correlation for following data given. (7)

Q 3. A. Explain the method of systematic sampling. Give an example. (3)

Q 3. B. A bakery has the following schedule of daily demand for cakes.

No. of cakes demanded (in hundreds)	0	1	2	3	4	5	6	7	8	9
Probability	0.02	0.07	0.09	0.12	0.20	0.20	0.18	0.10	0.01	0.01

Find the expected number of cakes demanded per day. (6)

Q 3. C. The average number of phone calls per minute in a call center is 4. Find the probability that during one particular minute, the number of calls is i) exactly 2 ii) less than 2. (Given $e^{-4} = 0.0183$). (7)

OR

Q 3. X. What is cluster sampling? Give an example. (3)

Q 3. Y. The monthly demand for radios is known to have the following probability distribution

Demand	1	2	3	4	5	6
Probability	0.10	0.15	0.20	0.25	0.20	0.10

Determine the expected demand for radios. (6)

Q 3. Z. An unbiased coin is tossed 4 times. What is the probability of getting i) 3 heads ii) at least one head? (7)

Q 4. A. If mean of a binomial distribution is 3 and variance is $\frac{3}{2}$, find n, p and q. (3)

Q 4. B. A sample of 50 bulbs from a large consignment showed a mean life 52 hours with a standard deviation of 4 hours. Find the 95% confidence interval for the mean life of the bulbs. (6)

Q 4. C. A sample of 100 dry battery cells tested found mean life 12 hours with a standard deviation of 3 hours. Assuming the data to be normally distributed, what percentage of battery cells are expected to have life of i) more than 15 hours ii) between 9 and 12 hours?
(Area under the standard normal curve between t = 0 and t = 1 is 0.3413) (7)

OR

Q 4. X. If x is a random variable following Poisson distribution with $4P(x = 0) = P(x = 1)$ then find mean and standard deviation. (3)

Q 4. Y. From a sample of 90 parts, 15 were found to be defective. Find 99% confidence interval for the population proportion of parts that are defective. (6)

Q 4. Z. If the mean weight of 10000 soldiers in a regiment is normally distributed with mean 72 kg and standard deviation of 5 kg then find i) the number of soldiers with weight between 70 kg and 77 kg ii) the percentage of soldiers with weight more than 70 kg.
(Area under the standard normal curve between t = 0 and t = 1 is 0.3413 and between t = 0 and t = 0.4 is 0.1554) (7)

Q 5. A. Define the terms i) Type I error ii) Critical region (3)

Q 5. 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)

Q 5. C. A well known company manufacturing laptops selects 6 laptops at random for testing their quality. Number of defects in each laptop is given as follows:

Sample no.	1	2	3	4	5	6
No. of defects	4	3	11	1	2	3

Construct the C chart for this data and state whether the process is in control or not. (7)

OR

Q 5. X. What are the advantages of Statistical quality control? (3)

Q 5. Y. A random sample of 500 items has sample proportion 0.15. Can we say that it is drawn from a population with proportion 0.2 at 5% level of significance? (6)

Q 5. Z. The following data gives the reading of 10 samples of size 4 in the production of a certain item.

Sample Number	1	2	3	4	5	6	7	8	9	10
Mean ($\bar{X}$)	25	34	26	14	18	20	10	15	32	12
Range (R)	2	4	6	3	7	4	5	6	8	1

Draw $\bar{X}$ - chart. (For sample size $n = 4$, $A_2 = 0.729$) (7)

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