



॥ विद्या सर्वस्य मूषणम् ॥

PRABODHAN EDUCATION SOCIETY'S

Vidya Prabodhini College of Commerce, Education, Computer & Management
Vidyanagar, Alto-Parvari, Goa

SEMESTER END EXAMINATION – APRIL 2017 (Regular/Repeat)

Sub: STATISTICAL TECHNIQUES - II

M. Marks: 80

Semester: IV

M. Time: 2 hrs.

INSTRUCTIONS: 1. All questions are compulsory however internal choice is available.

2. Use of calculator is allowed.

3. Figures to the right indicate marks allotted.

4. There are 5 main questions each carrying 16 marks.

5. You may answer randomly but every main question attempted should be answered serially.

Q 1) Attempt the following:

a) Define correlation. State different types of correlation. (3)

b) Draw a scatter diagram to represent the following data. Is there any correlation? (6)

X	85	90	40	60	73
Y	93	90	50	75	65

c) For the following data obtain regression equation X on Y. (7)

X	2	4	6	8	10
Y	4	2	5	10	13

OR

Q 1) Attempt the following:

x) State properties of Karl Pearson's coefficient of correlation. (3)

y) Following are the ranks given to two variables. Calculate Spearman's rank correlation coefficient. (6)

X	7	3	6	1	8	5	4	2
Y	8	2	7	1	6	5	3	4

z) If $\bar{x} = 52$, $\bar{y} = 12$, $\sigma_x = 7$, $\sigma_y = 12$, $r = 0.7$, then find the value of y when $x = 30$. (7)

Q 2) Attempt the following:

a) Define probability. State theorems on probability. (3)

b) Compute coefficient of correlation for the following data (6)

$$n = 8, \sum x = 421, \sum y = 403, \sum x^2 = 28055, \sum y^2 = 26439, \sum xy = 27105$$

- c) A player tosses 3 fair coins. He wins ₹6 if 3 heads appear, ₹4 if 2 heads appear and ₹1 if 1 head appear. On the other hand, he loses ₹5 if 3 tails occur. Find his expected gain. (7)

OR

Q II) Attempt the following:

- x) Explain Random Experiment, Sample Space and Event. (3)
y) If $R = 0.8$, $\sum d^2 = 33$, then find the number of observations 'n'. (6)
z) Find the probability of getting a sum of 8 or more when two dice are thrown. (7)

Q 3) Attempt the following:

- a) Write down the properties of a normal curve. (3)
b) Two cards are drawn from a well shuffle pack of cards. Find the probability that (i) both are spades, (ii) both are kings, (iii) both are black. (6)
c) 1000 tubes with an average life of 120 days are installed in the streets of Goa. Their life span is normally distributed with standard deviation 20 days.
(i) How many tubes will expire in less than 90 days?
(ii) How many tubes will have life expectancy of more than 100 days?
(Given area between $t = 0$ & $t = 1.5$ is 0.4332, area between $t = 0$ & $t = 1$ is 0.3413) (7)

OR

Q III) Attempt the following:

- x) The probability of tossing a head is 0.2. find the mean and mode of the distribution if 100 coins are tossed. (3)
y) Two die are thrown simultaneously. Find the probability that the sum of the digits on the uppermost face is 6. (6)
z) A coin is tossed 5 times. What is the probability of getting 3 or more tails? (7)

Q 4) Attempt the following:

- a) Explain the methods of enumeration. (3)
b) A manufacturing unit manufactures scooters. It has been observed that the probability of defective pieces of scooter is $1/25$. If a consignment of 50 scooters is considered, using Poisson distributions find the probability of finding (i) no defective scooter, (ii) 2 defective scooters. (Given : $e^{-2} = 0.1353$, $e^{-0.2} = 0.8187$). (6)
c) A random sample of 100 families, found that the average monthly income per family was ₹6,000. If standard deviation is ₹2,000, test the claim that the average monthly income of population is ₹7,500 with 5% level of significance. (7)

OR

Q IV) Attempt the following:

- x) State merits and demerits of simple random sampling. (3)
- y) For a set of 1000 observations known to be normally distributed, the mean is 534 cms and standard deviation is 13.5 cms. How many observations will lie between 520.5 and 547.5 cms? (Given: area between $t = 0$ & $t = 1$ is 0.3413) (6)
- z) A sample of 80 students gives the result that their average percentage in 12th HSSC is 63%. Can we say that the students passing HSSC has average percentage less than 66% with standard deviation 3% at 5% level of significance? (7)

Q 5) Attempt the following:

- a) Write a short note on point estimate and interval estimate. (3)
- b) Construct R chart for the data given below and comment. (6)

Sample no.	1	2	3	4	5	6	7	8
Sample range	4	6	6	8	4	7	7	5

(Given: $D_3 = 0$, $D_4 = 2.115$)

- c) Construct X chart for the data given below and comment. (7)

Sample no.	1	2	3	4	5	6	7	8	9	10
Mean (X)	43	46	47	51	37	45	44	37	49	43
Range (R)	2	3	3	4	6	3	2	6	7	6

(Use: $A_2 = 0.58$, $D_3 = 0$, $D_4 = 2.12$)

OR

Q V) Attempt the following:

- x) Explains types of error. (3)
- y) Construct R chart for the data given below and comment. (6)

Sample no.	1	2	3	4	5	6	7	8
R	0.012	0.019	0.012	0.006	0.010	0.032	0.046	0.048

(Given: $D_3 = 0$, $D_4 = 2.12$)

- z) Construct X chart for the data given below and comment. (7)

Sample no.	1	2	3	4	5	6	7	8	9	10
Mean (X)	753	614	707	582	505	383	514	337	557	508
Range (R)	80	28	37	91	100	95	148	65	68	128

(Use: $A_2 = 0.53$, $D_3 = 0$, $D_4 = 2$)