Goa Vidyaprasarak Mandal's
GOPAL GOVIND POY RAITURCAR COLLEGE OF COMMERCE AND ECONOMICS
PONDA - GOA
B.COM. (SEMESTER - IV) EXAMINATION (New Course) MAY 2019
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.

Q 1. Answer the following

A. Explain Scatter diagram method of measuring correlation. (3)

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

x	7	6	5	4	3	2	1
y	18	16	14	12	10	6	8

(6)

C. Find rank correlation coefficient between x and y from the following data

Singer	A	B	C	D	E	F
Rank by Judge I(x)	2	4	3	5	6	1
Rank by Judge II(y)	1	3	2	6	5	4

(7)

OR

Q 1. Answer the following

X. What are regression coefficients? Write the formula that gives the relation between regression coefficients and correlation coefficient. (3)

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

x	3	7	4	2	1	4	1	2
y	11	16	9	4	7	6	3	8

(6)

Z. For the following data, obtain the regression equation of y on x and find y when x = 10

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

(7)

Q 2. Answer the following

A. Define the terms i) Random experiment ii) Event (3)

B. Two balls are drawn from a bag containing 5 white and 6 blue balls. Find the probability that i) both are blue ii) one is white and one is blue. (6)

C. For a bivariate data, $n = 10$, $\sum x = 20$, $\sum y = 40$, $\sum xy = 75$, $\sum x^2 = 58$, $\sum y^2 = 192$ Calculate coefficient of correlation. (7)

OR

Q 2. Answer the following

X. State addition theorem and multiplication theorem of probability (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. Calculate Spearman's Rank Correlation Coefficient for following data.

X	65	66	67	68	69	70	72
Y	67	68	65	72	69	71	78

(7)

Q 3. Answer the following

A. Explain the terms i) Census survey ii) Sample survey. (3)

B. 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)

C. 70% of workers in a factory are union members. If 5 workers are selected at random, what is the probability that at least 4 are union members? (7)

OR

Q 3. Answer the following

X. What is stratified sampling? When is it useful? (3)

Y. A player tosses a coin twice. He wins ` 8 if 2 heads occur, ` 3 if 1 head occurs and looses ` 5 if no head occurs. Find his expected gain. (6)

Z. The watches produced by a certain factory include only one defective watch in every 500 watches. 5 packs of 25 watches each are considered. Find the probability that in 5 packets there is i) exactly one defective watch
ii) At least one defective watch
(Given $e^{-0.25} = 0.7788$) (7)

Q 4. Answer the following

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

B. A random sample of 100 bulbs selected from a large consignment gives the average life of 1500 hours with a standard deviation of 30 hours. Find 95% confidence limits and confidence interval for the average life of bulbs of that consignment. (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 marks?
(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

Q 4. Answer the following

X. If mean of a binomial distribution is 20 and standard deviation is 4, find n, p and q. (3)

Y. From a sample of 500 pairs of shoes manufactured by a shoe company, 2% are found to be of substandard quality. Estimate a 95% confidence interval for the percentage of substandard quality shoes in the shoe company. (6)

Z. The income of 10,000 persons is normally distributed with mean `6,000 and standard deviation `100. Find the numbers of persons having i) income between `5,800 and `6300 ii) income more than `5800.
(Area between i) t = 0 and t = 2 is 0.4772 ii) t = 0 and t = 3 is 0.4987) (7)

Q 5. Answer the following

A. Write a short note on control charts. (3)

B. A random sample of 400 iron rods indicated that the average length of rod is 10 cm. Can this be regarded as a sample from a large population with a mean of 10.2 cm and standard deviation of 2.25 cm at 1 % L.O.S. ? (6)

C. Construct a suitable control chart for the following data and comment

Sample No.	1	2	3	4	5	6
Fraction defective	0.3	0.2	0.4	0.1	0.5	0.3

(7)

OR

Q 5. Answer the following

X. Explain what you understand by statistical quality control . (3)

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)

Z. Ten samples of size 5 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	9	10
Mean ($\overline{X}$)	20	34	45	39	26	29	13	34	37	23
Range (R)	23	39	15	5	20	17	21	14	37	10

(Given : A_2 for sample size 5 is 0.577) (7)

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