C.E.S COLLEGE OF ARTS & COMMERCE, CUNCOLIM SALCETE-GOA

S.Y.B.COM IVth SEMESTER END EXAMINATION, APRIL 2018

STATISTICAL TECHNIQUES

TIME: 10.00 a.m. to 12.00 noon — DURATION: 2 HRS

DATE:20/04/2018 — Max Marks:80

Instruction: 1) Attempt all questions.

2) Figure to the right indicates full marks.

3) Use of non- programmable calculator is allowed.

4) Log tables and graph papers will be supplied on request.

Q.1: Attempt the following:

a) Define Correlation. (03)

b) Two cards are drawn from pack of 52 cards. Find the Probability distribution of number of aces. (06)

c) i) Three Coins are tossed. Find the chance of getting atleast one head. (04)

ii) What is the Probability that the leap year will have 53 Mondays? (03)

OR

Q.I: Attempt the following:

x) Explain regression analysis. (03)

y) The average number of incoming telephone calls at a switch board per minute is 2. Find the Probability that during a given minute, 2 or more calls are received. (e^{-2}=0.135) (06)

z) i) One purse contains 4 silver and 2 gold coins. Another purse contains 3 silver and 3 gold coins. A coin is drawn from one of these. What is the chance of getting a gold coin? (04)

ii) A box contains 2 white, 3 red and 4 green balls. One ball is drawn from the box. Find the Probability that is white or green. (03)

Q.2: Attempt the following:

a) Define Probability. (03)

b) Consider the following data: (06)

x:	1	2	3	4	5
y:	2	4	3	5	7

Find coefficient of correlation.

c) Eight samples of size 4 each are drawn. The mean and the range of each sample is given below: (07)

Sample	S_1	S_2	S_3	S_4	S_5	S_6	S_7	S_8
Mean	1.35	2.51	1.8	2.39	1.48	2.11	1.5	1.71
Range	0.3	0.5	0.4	0.6	0.3	0.7	0.5	0.4

Draw control chart for mean w.r.t. range. (A_2 = 0.729 for a sample of size 4)

OR

Q.II: Attempt the following:

x) State and prove addition theorem on Probability. (03)

y) The following data is about the marks scored by 10 students: (06)

Students No	1	2	3	4	5	6	7	8	9	10
Marks in Stats	80	55	90	75	62	46	49	52	67	50
Marks in Mgt	92	60	89	79	64	50	54	66	70	59

Find rank co-efficient of correlation.

z) Six samples of size 5 each are drawn for testing the quality of the mean. The mean and S.D. of each sample is given below: (07)

Sample	S_1	S_2	S_3	S_4	S_5	S_6
Mean	12.5	14.3	13.4	11.8	12.6	14.7
S.D.	1.5	1.8	2.4	1.6	1.9	2.3

Draw control chart for $\bar{x}$ w.r.t the S.D. (A_1 = 1.596 for a sample of size 5)

Q.3: Attempt the following:

a) Explain purposive sampling. (03)

b) Consider the following data: (06)

x:	1	2	3
y:	2	1	6

Find the equations of regression lines.

c) Data entry clerk claims that she can type at an average speed of not less than 45 words per minute. A random sample of 36 minutes showed an average speed of 44 words per minute with a S.D. of 6 words per minute. Test the claim. (07)

OR

Q.III: Attempt the following:

x) What do you mean by Simple random sampling. (03)

y) For a bivariate data: (06)

Mean value of x = 52.1 ; Mean value of y = 112. Variance of x = 49 ; Variance of y = 144 and coefficient of correlation γ = -0.6. Find equations of regression lines.

z) A certain coin showed up head on 120 occasions in 200 tosses. Test the claim that coin is unbiased. (07)

Q.4: Attempt the following:

a) Explain binomial distribution. (03)

b) For a bivariate data the regression line of y on x is $5x - 6y + 90 = 0$ and the regression line of x on y is $15x - 8y - 180 = 0$. Find the coefficient of correlation between x and y. (06)

c) Six samples of size 5 are selected. The fraction defective of each samples is as follows: (07)

Sample (s)	S_1	S_2	S_3	S_4	S_5	S_6
Fraction Defectives(p)	0.3	0.2	0.4	0.1	0.5	0.3

Draw control chart for p.

OR

Q.IV: Attempt the following:

x) Give any three properties of normal distribution. (03)

y) For the bivariate data with mean and varience as: (06)

	x	y
Mean	6	4
Varience	0.5	2.5

Find the equations of regressions lines. Also find (a) y, when x = 2 and (b) x, when y = 1.

z) Five samples are drawn from the output of an industry. The number of faults in each sample is listed as follows: (07)

Sample	S_1	S_2	S_3	S_4	S_5
Defaults	3	1	2	0	1

Draw the control chart for c and check whether the system is in control.

Q.5: Attempt the following:

a) Differentiate between type I error and type II error. (03)

b) The incomes of a group of 10,000 persons were distributed normally with mean Rs. 6,000/- and S.D. 100. Find: (06)

i) The number of persons having income between 5,800 and 6,300.

ii) The lowest income of richest 700 people. [A(bet^n t = 0 & t = -2) = 0.4772; A(bet^n t = 0 & t = 3) = 0.4987; A(bet^n t = 0 & t = 1.48) = 0.43]

c) i) A room contains 3 sockets for bulbs. From a collection of 8 bulbs out of which 4 are defectives, 3 bulbs are selected at random and put in the sockets. Find the Probability that room is lit. (04)

ii) The equations of regression lines are $x + 2y = 4$ and $2x + 2y = 6$. Find mean of x and mean of y. (03)

OR

Q.V: Attempt the following:

x) Define Critical region. (03)

y) 200 Candidates appeared for a certain examination. The mean marks was 59 and S.D. was 5. Assuming the distribution to be normal, find: (06)

i) Percentage of students securing marks below 49.

ii) Minimum marks of top 25% of the students. [A(bet^n t = 0 & t = 1) = 0.3413; A(bet^n t = 0 & t = 2) = 0.4772]

z) i) Two cards are drawn from a pack of cards. Find the Probability that: (04)

a) Both are hearts.

b) One is heart and other is a spade.

ii) If the two regression line for a bivariate data are $2x - y = 15$ and $4y = 3x + 25$. Find $\bar{x}$. (03)

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