

C.E.S COLLEGE OF ARTS & COMMERCE, CUNCOLIM SALCETE-GOA
S.Y.B.COM IVth SEMESTER END EXAMINATION, APRIL 2019(Old Course)
STATISTICAL TECHNIQUES

TIME: 2.00 to 4.00 p.m.
DATE: 15/04/2019

DURATION: 2 HRS
Max Marks: 80

Instruction: 1) Attempt all questions.

2) Figure to the right indicate 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) Explain Correlation. (03-marks)
b) A coin is tossed 3 times. Find the probability distribution of number of heads. (06-marks)
c) i) A die is thrown. Find the probability of getting an even number. (03-marks)
ii) A box contains 4 white, 2 black and 3 red balls. Find the probability of getting red ball in a single drawn. (04-marks)

OR

Q.1. Attempt the following:

- x) Explain Scatter diagrams. (03-marks)
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-marks)
z) i) A box contains 20 tickets numbered from 1 to 20. One ticket is drawn from this box. Find the probability of getting a ticket bearing a multiple of 5. (03-marks)
ii) Two coins are tossed. Find the probability of getting exactly 2 heads. (04-marks)

Q.2: Attempt the following:

- a) Define conditional probability. (03-marks)
b) Calculate Coefficient of Correlation for the following: (06-marks)
x: 1 2 3
y: 2 1 6
c) Six samples of size 5 each are drawn for testing the quality of mean. The mean and S.D. of each sample is given below. Draw \bar{x} chart with respect to S.D. (07-marks)

Sample	S ₁	S ₂	S ₃	S ₄	S ₅	S ₆
Mean(\bar{x}_i)	12.5	14.3	13.4	11.8	12.6	14.7
S.D.(S _i)	1.5	1.8	2.4	1.6	1.9	2.3

(Take $A_1 = 1.596$, for a sample of size 5)

OR

Q.II. Attempt the following:

- x) Explain mutually exclusive events. (03-marks)
y) For a bivariate data $N=10$; $\sum x=20$; $\sum y=40$; $\sum xy=75$; $\sum x^2=58$; $\sum y^2=192$. Calculate the product moment coefficient of correlation. (06-marks)
z) Eight samples of size 4 each are drawn. The mean and the range of each sample is given below. Draw control chart for mean with respect to range. (Take $A_2 = 0.729$, for a sample of size 4) (07-marks)

Sample	S ₁	S ₂	S ₃	S ₄	S ₅	S ₆	S ₇	S ₈
Mean(\bar{x}_i)	1.35	2.51	1.8	2.39	1.48	2.11	1.5	1.71
Range.(R)	0.3	0.5	0.4	0.6	0.3	0.7	0.5	0.4

Q.3: Attempt the following:

- a) Explain random sampling. (03-marks)
b) Consider the following data: (06-marks)

x:	2	3	4
y:	3	5	7

Find the equation of regression lines.

- c) A random sample of size 400 has sample proportion 0.75. Can we say that, it is from population with proportion $P=0.8$ at 5% level of significance? (07-marks)

OR

Q.III: Attempt the following:

- x) Discuss quota sampling. (03-marks)
- y) The equations of regression lines between x and y is given as $4y-15x-530=0$ and $20x-3y-975=0$. Find \bar{x} , \bar{y} and r . (06-marks)
- z) A certain coin showed up head on 40 occasions in 400 tosses. Test the claim that coin is unbiased. (07-marks)

Q.4: Attempt the following:

- a) State properties of Poisson Distribution. (03-marks)
- b) $\bar{x} = 40$; $\bar{y} = 75$; S.D. of $x = 4$; S.D. of $y = 10$ coefficient of correlation $r_{xy}=0.4$. Find equation of regression lines. Also estimate (i) y when $x = 50$ and (ii) x when $y = 69$. (06-marks)
- c) The following is the data regarding number of defectives in 12 samples of size 50. Prepare a control chart for the proportion of defectives. (07-marks)
- | Sample No | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| No of Defectives | 0 | 3 | 2 | 0 | 2 | 3 | 3 | 4 | 4 | 4 | 3 | 2 |
| Fraction of Defectives | 0.06 | 0.04 | 0.00 | 0.04 | 0.06 | 0.06 | 0.08 | 0.08 | 0.06 | 0.04 | 0.00 | 0.08 |

OR

Q.IV: Attempt the following:

- x) Define Binomial Distribution. (03-marks)
- y) Consider the following data: (06-marks)
- | | | | | |
|-------|---|---|---|----|
| x : | 2 | 3 | 5 | 7 |
| y : | 1 | 5 | 8 | 10 |
- Find equations of regression lines.

z) Consider:

Sheet No	1	2	3	4	5	6	7	8	9	10	11	12
No of Defects	3	2	0	1	1	4	3	2	3	2	2	1

Find C-chart (07-marks)

Q.5: Attempt the following:

- a) Explain level of significance. (03-marks)
- b) For a normal variate x with mean 500 and standard deviation 100, find $P(500 < x < 634)$. [Use $A(\text{bet}^n z=0 \text{ and } z=1.34)=0.4099]$ (06-marks)
- c) i) One card is drawn from a pack of well shuffled cards. Find the probability that, it is spade or a king card. (03-marks)
- ii) Consider the following: (04-marks)

	x	y
Mean	6	4
Variance	0.5	2.5

And Covariance of $xy=1$. Find equations of regression lines.

OR

Q.V: Attempt the following:

- x) Explain critical region. (03-marks)
- y) A coin is tossed 4 times. Find the Probability of getting more than 2 heads. (06-marks)
- z) i) A die is thrown. Find the Probability of getting an even number or a number greater than 2. (03-marks)
- ii) The equations of regression lines are $x-2y=4$ and $2x-y=2$; find mean of x and mean of y . (04-marks)

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