

Seat No. : 01969

ML-103

December-2016

B.B.A., Sem.-III

CC-206 : Elementary Statistics

Time : 3 Hours]

[Max. Marks : 70

1. (a) Define the following terms : (any two)

- Mutually Exclusive events
- Inverse Probability
- Classical definition of Probability

OR

Define Mathematical expectation and state its properties.

(b) The probability that person A will get rank in NET is $\frac{3}{5}$ and a probability that he will not get a rank in GSET is $\frac{7}{9}$. If the probability of getting at least one rank is $\frac{5}{9}$, what is the probability that he will get both the ranks ?

OR

The odds in favour of person X getting promotion is 5:7 and the odds against person Y getting promotion is 12 : 15.

- (i) What is the probability that promotion will be given ?
- (ii) What is the probability that neither can get promotion, if they both try independently ?

(c) Probability that person A will clear final exam is 0.4 and the probability that person B will clear exam 0.6. Find the following :

- (i) Both will clear exam
- (ii) only person B will clear the exam
- (iii) at least one of them will clear the exam

OR

In Airline booking service, three executives, X, Y and Z are assessing reservation forms. X assessed 40% of forms, Y assessed 35% of forms and Z assessed the rest of the forms. Error rate of X is 0.05, error rate of Y is 0.04 and error rate of Z is 0.03. A reservation form is selected at random from the total number of forms assessed during the day and found to have an error. Find the probability that it was assessed (i) by Y, (ii) by Z.

2. (a) Give the properties of Binomial distribution. 4

OR

There are 500 tickets of ₹ 1 each. There is only one ticket in the lottery bearing a prize of ₹ 11,000. A girl purchases a ticket. Find her expectation of winning a lottery.

- (b) Ramesh tosses three coins simultaneously. He gets rupees 6, 8, 10, 15 respectively for 0, 1, 2 and 3 heads. What will be his expectation? 5

OR

For a Binomial distribution, Mean = 100 and S.D. = 8, find its parameters.

- (c) In a book on an average, there are 4 misprints in 8 pages. Using Poisson distribution, find the number of pages having more than 2 misprints in the book of 150 pages. 5

OR

There are 50 mobiles in a lot and 11 of them are defective. If 4 mobiles are taken one after the other from it, find the probability that at the most one mobile is defective.

3. (a) Differentiate : Correlation and Regression. 4

OR

Discuss the properties of Regression coefficients.

- (b) Find the correlation coefficient using following data by applying Rank correlation method. Also find coefficient of determination. 6

| | | | | | | | | | | |
|-----|----|----|----|----|----|----|----|----|----|----|
| X : | 45 | 48 | 50 | 45 | 52 | 55 | 50 | 48 | 50 | 60 |
| Y : | 38 | 42 | 22 | 40 | 42 | 45 | 55 | 35 | 40 | 35 |

OR

Find Regression line of X on Y from the following data. Obtain value of X when Y = 50.

| X | Y | | | |
|-------|-------|-------|-------|-------|
| | 25-30 | 30-35 | 35-40 | 40-45 |
| 10-20 | 2 | 3 | 1 | — |
| 20-30 | — | 4 | 5 | 3 |
| 30-40 | 7 | — | 6 | 8 |
| 40-50 | 2 | — | 8 | 1 |

(c) Calculate $R_{2.13}$, $R_{3.12}$ and $r_{12.3}$ from the following data :

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$$r_{12} = 0.55, r_{13} = 0.65, r_{23} = 0.35$$

OR

$$r_{12} = 0.4, r_{13} = 0.25, r_{23} = 0.62$$

$$S_1 = 20, S_2 = 30, S_3 = 50$$

Obtain Regression Equation of plane for variable x_3 on x_1 and x_2 .

4. (a) Differentiate : Attribute charts v/s Variable charts.

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OR

Define the following : (any two)

- AQL
- Producer's Risk
- LTPD

(b) Construct X and R charts for the following data of 10 samples each of size 6 and write down comments on it.

6

| Sample No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|------------|----|----|----|----|----|----|----|----|----|----|
| X | 35 | 42 | 48 | 33 | 37 | 41 | 55 | 47 | 49 | 32 |
| R | 4 | 7 | 8 | 11 | 5 | 8 | 4 | 2 | 6 | 9 |

OR

Draw an appropriate chart for the following data. State whether the situation is under control or not with the reason.

| | | | | | | | | | | |
|------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Observed items | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 |
| No. of defective items | 8 | 12 | 14 | 18 | 6 | 10 | 15 | 13 | 11 | 16 |

(c) For sampling plan (100, 20, 1) and lot defective 5% obtain the following :

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- Probability to accept the lot
- Probability to reject the lot

OR

For a SSP (50, 15, 1) find OC curve and obtain AOQ.

5. Do the following :

- (1) Define favourable cases.
- (2) If $V(x) = 10$, then find $V(3x + 2)$
- (3) For _____ distribution mean and variance will be different.
- (4) Define Partial correlation.
- (5) Draw ideal OC curve.
- (6) Give the formula of LCL for np-chart.
- (7) What is AOQL ?
- (8) Who has initiated SQC in India ?
- (9) In rank correlation if $\sum d^2 = 0$, $r =$ _____.
- (10) If $n = 25$ and $r = 0.9$, what will be probable error ?
- (11) Give the formula of Mean for Hypergeometric distribution.
- (12) When n is very large and p is very small, Binomial distribution will be converted into _____ distribution.
- (13) _____ chart is used for controlling number of defects in a mobile handset.
- (14) The regression coefficient is independent of change of origin and scale (True/False.)

Statistical Values :

$$e^{-0.5} = 0.6065$$

$$e^{-1} = 0.3680$$

$$e^{-3} = 0.0498$$

$$n = 5$$

$$A_2 = 0.58, D_3 = 0, D_4 = 2.12$$

$$n = 6$$

$$A_2 = 0.48, D_3 = 0, D_4 = 2.01$$