AR-121

April-2022

M.B.A., Sem.-IV

Business Statistics

Time : 2 Hours]   **[Max. Marks : 50**

Instructions : (1) All questions in Section – **I** carry equal marks. Attempt ANY **THREE** questions in Section – **I**.

                (2) All questions in Section – **II** carry equal marks. Attempt ANY **FOUR** in Section – **II**.

                (3) Statistical tables will be provided on demand.

                (4) Use of Non-programmable scientific calculator is allowed.

SECTION – I

Attempt ANY **THREE** questions out of **five**.

1. (A) The following is the frequency distribution of 128 throws of seven coins, according to the number of heads :   **7**

No. of Heads	0	1	2	3	4	5	6	7
Throws	7	6	19	35	30	23	7	1

Fit a binomial distribution under the hypothesis that the coins are unbiased. What is the mean and standard deviation ?

(B) In a certain factory turning out razor blades. There is a small chance 1/500 for any blade to be defective. The blades are supplied in packets of 10. Use the Poisson distribution to calculate the approximate number of packets containing no defective, one defective and two defective blades respectively in a consignment of 10,000 packets. ($e^{-0.2} = 0.9802$)   **7**

2. (A) A sample of 100 dry battery cells tested to find the length of life produced the following results : Mean =12 hours, Standard deviation = 3 hours. Assuming that the data are normally distributed, what percentage of battery cells are expected to have life : (1) more than 15 hours, (2) less than 6 hours and (3) between 10 and 14 hours ? 7

   (B) Suppose the amount of time it takes to assemble a plastic module range from 27 to 39 seconds and that assembly times are uniformly distributed. What is the probability that a given assembly will be taken between 30 and 35 seconds ? Fewer than 30 seconds ? 7

3. (A) While calculating the correlation co-efficients between two variables x and y from 25 pairs of observations, obtained the following results : n $=$ 25, Σx $=$ 125, Σy $=$ 100, Σx^2 $=$ 650, Σy^2 $=$ 460, Σxy $=$ 508. It was however, discovered at the time of checking that he had copied down two pairs of observations as (6,14), (8,6) instead of (8,12), (6,8). Obtain the correct value of correlation co-efficient between x and y. 7

   (B) Find Yule's co-efficient of association from following data : 7

   $N = 170, (A) = 80, (\beta) = 120, (\alpha\beta) = 20.$

4. (A) Obtain regression line y on x. from the following bivariate table : 7

	0-500	500-1000	1000-1500	1500-2000	2000 - 2500
0-200	12	6	–	–	–
200-400	2	18	4	2	1
400-600	–	4	7	3	–
600-800	–	1	–	2	1
800-1000	–	–	1	2	3

(B) Estimate y when $x = 70$ and x when $y = 90$ from the following data: correlation co-efficients between x and y is 0.8 **7**

	X	Y
Mean	18	100
S.D.	14	20

5. (A) In a trivariate distribution, if $r_{12} = 0.7$, $r_{13} = 0.61$ and $r_{23} = 0.4$. Find $R_{1.23}$ and $r_{12.3}$. **7**

(B) Find the equation of the regression model for the following data. Comment on the regression co-efficients. Determine the predicted value of y for $x_1 = 200$ and $x_2 = 7$. **7**

y	x_1	x_2
12	174	3
18	281	9
31	189	4
28	202	8
52	149	9
47	188	12
38	215	5
22	150	11
36	167	8
17	135	5

SECTION - II

Attempt **ANY FOUR** questions. 8

6. In the following sub-questions more than one answer is given. You are required to select correct answer.

(1) For a Poisson distribution, if mean $(m) = 1$, then $P(1)$ is ?

    (a) 0

    (b) $\dfrac{1}{e}$

    (c) 1

    (d) ∞

(2) In Normal distribution.

    (a) Mean = Median = Mode

    (b) Mean < Median < Mode

    (c) Mean > Median > Mode

    (d) Mean ≠ Median ≠ Mode

(3) $N = 290$, $(AB) = 40$, $(\alpha) = 100$, $(\beta) = 160$. Find the value of $(\alpha\beta)$.

    (a) 40

    (b) 20

    (c) -20

    (d) None

(4) Find regression line $\bar{x} = 72$, $\bar{y} = 15$, $S_x = 12$, $S_y = 4$, $r = 0.66$. Find y on x.

    (a) $y = -0.84 + 0.22\,x$

    (b) $y = 0.84 - 0.22\,x$

    (c) $y = -0.94 - 0.22\,x$

    (d) $y = 0.22 + 0.94\,x$

(5) Given $r_{12} = 0.5$, $r_{23} = 0.7$ and $r_{13} = 0.5$. Calculate $r_{23.1}$.

    (a) 0.5

    (b) 0.7

    (c) 0.6

    (d) 0.1

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