[5801]-523
T.Y. B.Com.
(356(F)) : BUSINESS STATISTICS - III
(2019 Pattern) (CBCS) (Semester - V)

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

Instructions to the candidates:

   1)   *All question are compulsory.*

   2)   *Figures to the right indicate full marks.*

   3)   *Use of statistical tables and calculator is allowed.*

Q1) a)   Fill in the blanks (any five) :   **[5]**

      i)   p chart is _____ type control chart.

      ii)   In game theory, if maximin ≠ minimax then there does not exist _____ point.

      iii)   In replacement problem, maintenance cost is always _____.

      iv)   We use _____ criteria to average the elements of payoff of corresponding strategy.

      v)   C-chart is used to control number of _____.

      vi)   Electric fluctuation is belonging to _____ causes.

  b)   State whether each of the statement given below is true or false :   **[5]**

      i)   p chart is used to control proportion of defectives.

      ii)   If value of the game is greater than zero then game is called as fair game.

      iii)   Control charts are applying on continuous production process.

      iv)   In replacement problem we can use value of money which remains the same during the period.

      v)   If quantity in hand is greater than demand then there exists opportunity loss.

P.T.O.

Q2) Attempt any two of the following :

    a)   Explain the following terms :

        i)   State of nature   **[1]**

        ii)   Capability index   **[3]**

        iii)   Tolerance limits   **[1]**

    b)   i)   State any two causes each from the assignable causes.   **[1]**

        ii)   Give any two business situations where game theory can be used.   **[1]**

        iii)   Obtain the saddle point for the following game :   **[2]**

$$\text{Firm X} \begin{matrix} & \text{Firm Y} \\ & \begin{bmatrix} 11 & -12 \\ -17 & 19 \end{bmatrix} \end{matrix}$$

        iv)   Give any two business situations where replacement problem can be used.   **[1]**

    c)   Solve the following game :   **[5]**

$$\text{Player A} \quad \begin{matrix} & \text{Player B} \\ & \begin{matrix} B_1 & B_2 & B_3 & B_4 \end{matrix} \\ \begin{matrix} A_1 \\ A_2 \\ A_3 \end{matrix} & \begin{bmatrix} 1 & 3 & 2 & 7 \\ 3 & 4 & 1 & 5 \\ 6 & 5 & 7 & 6 \end{bmatrix} \end{matrix}$$

    d)   The number of defects in 10 different carpets are as follows :   **[5]**
1, 0, 2, 3, 1, 2, 1, 3, 0, 0. Construct C chart.

Q3) a)   The maintenance cost and resale value per year of a machine whose purchase price is Rs. 10,000 is given below :   **[8]**

Year	Maintenance cost (in Rs.)	Resale value (in Rs.)
1	2,000	7,000
2	2,200	5,500
3	2,400	4,000
4	2,600	3,000
5	2,800	2,000
6	3,200	1,000
7	3,700	1,000
8	4,500	500

When should the machine be replaced?

b) For the following pay off table find the optional strategy by maximax, maximin, Laplace criterion and Hurwicz criterion. **[7]**

($\propto$ = 0.8)

State of nature → Act	N1	N2	N3	N4
S1	120	70	80	30
S2	90	80	60	70
S3	70	80	80	110

Q4) a) The following data on the basis of fuses sample of 5 being taken every hour : **[8]**

Sample No.	1	2	3	4	5	6	7	8	9	10	11	12
Mean	69.4	63.4	57	64	57.4	82	85	33.4	46	112.4	93.6	95.6
Range	45	48	62	48	36	81	78	42	69	84	48	75

Calculate control limits for mean and range. Also comment on whether the process seems to be under control.

[n = 5, A_2 = 0.577, D_3 = 0, D_4 = 2.115]

b) Write the pay off matrix for the given situation. The demand for cases in the retailer shop may be 13, 14, 15 with probabilities 0.2, 0.7, 0.1 respectively. Making cost and selling price of one case is Rs. 2 and Rs. 5 respectively. Balance case is treated as waste. Also obtain opportunity loss table. How much case should he make using EOL criteria? Verify that optional strategy obtained by EMV and EOL criterion are same? **[7]**

⌘⌘⌘