Total No. of Questions : 4]

SEAT No. : ____

P5903

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T.Y.B.Com.
356 - F : BUSINESS STATISTICS - III
(2019 Pattern) (Semester - V)

Time : 2½ Hours] ***[Max. Marks : 50***

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right side indicate full marks.***
3) ***Use of statistical table and calculator is allowed.***

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

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

ii) P-Chart is used to control _____.

iii) C-Chart is used to control _____.

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

v) Electric fluctuation is belonging to _____ causes.

vi) We use _____ criteria to average the elements of pay off of corresponding strategy.

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

i) If value of the game is zero then game is called as fair game.

ii) Control charts are applying on continuous production process.

iii) P-Chart is used to control proportion of defectives.

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

v) In two person zero-sum game, value of the game is always zero.

vi) If quantity in hand is less than demand then there exist opportunity loss.

P.T.O.

Q2) Attempt any two of the following: **[5 each]**

a) Solve the following game:

$$\begin{array}{cc} & \text{Player B} \\ \text{Player A} & \begin{matrix} A_1 \\ A_2 \\ A_3 \end{matrix} \begin{bmatrix} 2 & 0 & 3 \\ 3 & -1 & 1 \\ 5 & 2 & -1 \end{bmatrix} \\ & \quad B_1 \quad B_2 \quad B_3 \end{array}$$

b) The pieces of cloth in 10 different rolls contain following number of defects:

3,0,2,7,4,2,1,3,7,1.

Construct C-Chart. Comment.

c) Explain the following terms:

i) State of nature

ii) Tolerance limits

iii) State any two causes each from the assignable causes.

iv) Give any two business situations where game theory can be used.

v) Give any two business situations where replacement problem can be used.

d) What do you mean by control limits? What purpose do they serve in control charts?

Write control limits for P - Chart.

Q3) a) A machine is set to deliver packets of given tensile strength 10 samples of size 5 each were recorded as follows: **[8]**

Sample No.	1	2	3	4	5	6	7	8	9	10
Mean	15	17	15	18	17	14	18	15	17	16
Range	7	7	4	9	8	7	12	4	11	5

Construct control charts for mean and range, Also comment on whether the process seems to be under control. (Use n = 5, $A_2 = 0.577$, $D_3 = 0$, $D_4 = 2.115$)

b) From the following pay off table (of profit) defermine optimal strategy using maximin, maximax, Laplace and Hurwicz criterion. **[7]**

Take $\alpha = 0.7$

Demand $\rightarrow$ Stock $\downarrow$	A1	A2	A3	A4
S1	16	10	12	7
S2	13	12	9	9
S3	11	14	15	14

Q4) a) A machine owner finds from his past records that the maintenance costs per year of a machine whose purchase price is Rs. 8000 are as given below: **[8]**

Year	1	2	3	4	5	6	7	8
Maintenance Cost (Rs.)	1000	1300	1700	2200	2900	3800	4800	6000
Resale Cost (Rs.)	4000	2000	1200	600	500	400	400	400

Determine at which time it is profitable to replace the machine.

b) Write the pay off matrix for the given situation. The demand for Vadapav in the morning may be 21,22,23,24 and 25 with probabilities 0.1,0.15, 0.2,0.25 and 0.3 respectively. Making cost and selling price of one Vadapav is Rs. 8 and Rs.10 respectively. Balance Vadapav is treated as waste. Also obtain regret table. How much Vadapav should be make using EOL criteria? **[7]**