## Registration No :

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## $1^{\text {st }}$ Semester Back Examination 2019-20 STATISTICS AND DECISION SCIENCE BRANCH : MBA <br> Max Marks : 100 <br> Time: 3 Hours <br> Q.CODE: HB583

## Answer Question No. 1 (Part-1) which is compulsory, any EIGHT from Part-II and any TWO from Part-III. <br> The figures in the right hand margin indicate marks.

## Part-I

Q1 Only Short Answer Type Questions (Answer All-10)
a) Find the coefficient of variation if the sum of squared deviations taken from mean 40 of 10 observations is 360 .
b) If the S.D of $x$ is 3 , what is the variance of $(3 x-7)$.
c) The average of numbers is $x$, if each of the numbers is multiplied by $n+1$, then find the average of new set of numbers.
d) If the coefficient of determination is 0.64 and the regression coefficient of $x$ on $y$ is 4 then find regression coefficient of $y$ on $x$.
e) The regression line of $x$ on $y$ is $3 x-4 y=7$, then find correlation coefficient between $x \& y$.
f) If quartile deviation of a data is 60, then find mean deviation of this data.
g) Find coefficient of mean deviation about median of first 9 natural numbers.
h) If mean arrival time $=10$ customers per hour and mean service time $=20$ customers per hour, then find expected customers in queue.
i) Find the best strategy from the following pay-off matrix by minimax criterion.

$$
\left.\begin{array}{c} 
\\
S 1 \\
S 2
\end{array} \begin{array}{cc}
E 1 & E 2 \\
1 & 3 \\
5 & -2
\end{array}\right](\mathrm{E}=\text { event, } \mathrm{S}=\text { strategy }) .
$$

j) Using maximin-minimax principle, find value of the game between $A \& B$.

B
$\mathrm{A}\left[\begin{array}{lll}1 & 2 & 3 \\ 4 & 5 & 3\end{array}\right]$

## Part-II

Q2 Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve)
a) In a bank, cheques are cashed by a single teller counter, customers arrive at a counter at an average rate of 30 customers per hour. The teller takes on average a minute and a half to cash cheque. Find (a) Expected waiting time in the queue (b)Expected customers in the system.
b) A bakery shop keeps a popular brand of cake. Previous experience shows the daily demand for the item with probabilities as given below.

| Daily demand Nos | 0 | 10 | 20 | 30 | 40 | 50 |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| Prob. | .01 | .2 | .15 | .5 | .12 | .02 |

Use the following random numbers to simulate the demand for next 6 days.
Random nos: 25, 39, 65, 76, 12, 05.
c) Given is the following pay-off matrix.

|  | $S_{1}$ | $S_{2}$ | $S_{3}$ |
| :--- | :--- | :--- | :--- |
| $E_{1}$ | 2 | 0 | 8 |
| $E_{2}$ | -3 | 9 | -1 |
| $E_{3}$ | -8 | 6 | 12 |

Find the best strategy by minimax regret criterion [ $\mathrm{E}=$ event, $\mathrm{S}=$ Strategy]
d) Mr. X purchases a new car at every two years. He prefers a brand A car but sometimes buys another brand B car as per following transition matrix.

## Next Stage

Current State $A\left[\begin{array}{cc}A & B \\ B .8 & 0.2 \\ 0.6 & 0.4\end{array}\right]$
Interprete the matrix in term of (a) retention \& loss (b) retention \& gain.
e) Use dominance rule to solve the following game between two players $A \& B$.

$$
\mathrm{A}\left[\begin{array}{cc}
\mathrm{C} & 8 \\
4 & 8 \\
4 & 12
\end{array}\right]
$$

f) Correlation coefficient between $x \& y$ is 0.6 . Find correlation coefficient between $u \& v$, where $2 u+3 x=-4 \& 4 v+16 y=-11$.
g) The regression coefficient of $y$ on $x$ is 0.4 . Find regression coefficient of $v$ on $u$, where $u+2 x=5$ $\& v+3 y=10$.
h) If $\sum D^{2}=231, R=-0.4$, Find number of pairs. [ $\mathrm{D}=$ difference between two ranks]
i) Find A.M of square of first $2 n$ natural numbers.
j) The mean and S.D of 5 observations are $4.8 \& 6.16$. If three of the observations are $2,3 \& 6$, then find other two observations.
k) Find M.D about mode for the numbers $\frac{2}{7}, \frac{3}{7}, \frac{5}{7}, \frac{8}{7}, \frac{10}{7}, \frac{5}{7}$.
l) If $n=10, \Sigma x_{i}=110 \& \Sigma\left(x_{i}-5\right)^{2}=1000$, then find variation of $x$.

## Part-III

Only Long Answer Type Questions (Answer Any Two out of Four)
Q3 Solve the following LPP by simplex method.

> Minimize $Z=4 x+3 y$
> S.t
> $x+2 y \geq 8$
> $3 x+2 y \geq 12$
> $x \geq 0, y \geq 0$

Find BFS and TC from the following TP by NWCM and test for optimality by 'MODI' method.

|  | $W_{1}$ | $W_{2}$ | $W_{3}$ | Supply |
| :--- | :--- | :--- | :--- | :--- |
| $\mathrm{P}_{1}$ | 3 | 4 | 2 | 30 |
| $\mathrm{P}_{2}$ | 2 | 1 | 5 | 25 |
| $\mathrm{P}_{3}$ | 4 | 3 | 3 | 20 |
| Demand | 20 | 20 | 35 |  |

Q5 Solve by using dominance rule, the game

## B

$$
\mathrm{A}\left[\begin{array}{lll}
1 & 2 & 3  \tag{16}\\
4 & 5 & 6 \\
7 & 8 & 1
\end{array}\right]
$$

Q6 Two regression lines are given by $y=2 x$ \& $6 x-y=4$, Find (a)r $(b)(\bar{x}, \bar{y})(c) S . D$ of $x$ if S.D of $y$ is 2 .

