

Registration No :

--	--	--	--	--	--	--	--	--	--

Total Number of Pages : 03

MBA

18MBA105

1st Semester Regular Examination 2018-19

DECISION SCIENCE

BRANCH : MBA

Time : 3 Hours

Max Marks : 100

Q.CODE : E817

Answer Question No.1 (Part-1) which is compulsory, any EIGHT from Part-II and any TWO from Part-III.

The figures in the right hand margin indicate marks.

Part- I

Q1 Short Answer Type Questions (Answer All-10)

(2 x 10)

- If S.D of first 'n' natural numbers is 2, then find 'n'
- If the variance of x is 9, what is the variance of (5-2x)?
- Find the mean deviation about mode for the numbers $\frac{4}{11}, \frac{6}{11}, \frac{8}{11}, \frac{9}{11}, \frac{12}{11}, \frac{8}{11}$.
- Correlation Coefficient between x & y is 0.8 . Find Correlation Coefficient between u & v, where $2u-3x+4=0$ and $4v+16y+11=0$
- If the relationship between two variables x and y is $2x+3y+4=0$, then find value of Correlation Coefficient between x & y.
- Customers arrive at a booking counter being manned by a single man at a rate of 25 per hour. The time required to serve a customer with a mean of 120 seconds. Find expected waiting time of a customer in queue.
- Using dominance rule, find value of the following game between A&B.

B

A	$\begin{bmatrix} 7 & 8 & 6 \\ 4 & 10 & 2 \end{bmatrix}$
---	---

- Find the best strategy from the following pay-off table by using minimax regret criterion.

	E1	E2
a1	2	0
a2	-3	9

(E= event, a= strategy)

- The sum of 25 observations is 400 and the sum of squares of observations is 8900. Find coefficient of variation.
- Find S.D of 3,3,3,5,5,5.

Part- II

Q2 Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve)

(6 x 8)

- Two regression lines are given below $3x+2y=10$ & $6x+y=15$. Find correlation coefficient between x&y.
- In a bivariate sample, the sum of squares of differences between the ranks of observed values of two variables is 231 and the correlation coefficient between them is -0.4 . Find number of pairs.
- Mean and S.D of 100 observations are 40 and 5.1 respectively. By mistake one observation is misprint as 50 against 40. Hence find corrected mean and S.D.
- A sample of 100 arrivals of customers in a departmental store is according to the following distribution :

Time between arrival (min)	0.5	1	1.5	2	2.5	3
Frequency	12	21	36	19	7	5

Use the following random numbers to simulate for next 8 arrivals. Random Nos : 25,39,65,76,12,05,73,89.

- e) Three manufactures X,Y& Z are competing with each other.The following matrix gives the transition probabilities that customers will move from one manufacturer to the other in any month. Interpret the matrix in term of (a) retention and loss (b) retention and gain.

$$\begin{matrix} & \begin{matrix} X & Y & Z \end{matrix} \\ \begin{matrix} X \\ Y \\ Z \end{matrix} & \begin{pmatrix} 0.7 & 0.1 & 0.2 \\ 0.1 & 0.8 & 0.1 \\ 0.2 & 0.1 & 0.7 \end{pmatrix} \end{matrix}$$

- f) Given is the following Pay-off matrix :

Event	Prob.	Do not Expand	Expand 200 units	Expand 400 units
High demand	0.4	Rs. 2,500	Rs. 3,500	Rs. 5,000
Medium demand	0.4	Rs. 2,500	Rs. 3,500	Rs. 2,500
Low demand	0.2	Rs. 2,500	Rs. 1,500	Rs. 1,000

What should be the decision if we use EMV criterion?

- g) Customers arrive at a sales counter manned by a single man according to a poisson process with a mean rate of 20 per hour. The time required to serve a customer has an exponential distribution with a mean of 100 seconds. Find
- Prob. that service facility is idle.
 - Expected number of customers in queue.
 - Expected waiting time in the system.
- h) Runs made by two groups G_1 & G_2 of cricketers have means 50 & 40 and variances 49 & 36 respectively. Find which group is more consistent in scoring runs.
- i) The first of two samples has 100 items with mean 15 and S.D 3. If the whole group has 250 items with mean 15.6 and S.D $\sqrt{13.44}$, find the S.D of second group.
- j) Find initial B.F.S and transportation cost from the following transportation table by VAM.

	I	II	III	Capacity
A	10	7	8	45
B	15	12	9	15
C	7	8	12	40
Demand	25	55	20	

- k) If variance of the observations 1,2,4,5 & x is 2, find x.
- l) The relationship between two variables x and u is $u+3x=10$ and between y and v is $2y+5v=25$ and the regression coefficient of y on x is 0.8, what would be the regression coefficient of v on u?

Part-III

Long Answer Type Questions (Answer Any Two out of Four)

Q3 Solve the following LLP by simplex method (16)

Maximize $Z=2x+3y$

S.t

$$x+y \leq 8$$

$$x+2y=5$$

$$2x+y \leq 8, x,y \geq 0$$

Q4 Find BFS & TC from the following TP by NWCM and test for optimality by 'MODI' method (16)

	W1	W2	W3	Supply
F1	100	200	300	100
F2	140	100	500	110
Demand	80	120	60	

(W= Ware house, F= Factory)

Q5 Using dominance rule, find out optimal strategies for firm A & B and value of the game **(16)**

from the following pay-off matrix.

	Firm B	
Firm A	35	65
	40	50
	55	60

Q6 A marketing manager has five salesmen and five sales districts, considering the capabilities of the salesmen and nature of districts, the marketing manager estimates that sales per month (in hundred rupees) for each salesman in each district would be as follows :

Salesmen	A	B	C	D	E
1	12	38	40	28	40
2	40	24	28	21	36
3	41	27	33	30	37
4	22	38	41	36	36
5	29	33	40	35	39

Find the assignment of salesmen to districts that will result in maximum sales by applying HAM.