Class / Semester / Subject Code : F.Y.B.Com./ I / USBCOMFSI.6-Mathematical and Staistical Techniques-I

Date: 25.11.2019 Duration:[3 Hours] [Total Marks: 100]

N.B. 1) All questions are compulsory.
2) All questions carry equal marks.
3) Figures to the right indicate full marks.
4) Graph papers will be provided on request.
5) Use of non-programmable calculator is allowed..

SECTION-I

1. Attempt any **FOUR** questions from the following: (20)
   i. Find sum due to Rama , when he sold 200 shares at market value of Rs.40 per share , with the brokerage of 0.3%.
   ii. An investor joined a mutual fund with Rs.26,176 when NAV was Rs.80. When the NAV reached Rs 100 he sold all his units. Find his gain in the entire deal if the load is 2.25% and exit load is 0.5% .
   iii. If the market value of a share is Rs.120 then then how many shares can be purchased for Rs.60180 with brokerage 0.3
   iv. An investor joined the S.I.P scheme , for a M.F. , under which he would invest Rs.1500 for 5 months. If the NAVs for each month are Rs.70, Rs.65 , Rs.30 and Rs.55 ,Rs.45 find the arithmetic mean of the prices of the units and average acquisition cost per unit and comment.
   v. Two companies A and B have shares with face values of Rs.100 each and the market price of their shares are Rs.150 and Rs. 180 respectively . If the dividends declared by the company A is 15% and the company B is 17% , which company is better with respect to rate of returns.

2. Attempt any **FOUR** questions from the following: (20)
   i. In how many ways can a football team of 11 players be selected from 16 players ? How many of them will (a) include 2 particular players? (b) exclude 2 particular players?
   ii. A factory manufactures two products A and B. To manufacture one unit of A, 1.5 machine hours and 2.5 labor hours are required. To manufacture product B, 2.5 machine hours and 1.5 labor hours are required. In a month, 300 machine hours and 240 labor hours are available. Profit per unit for A is Rs. 50 and for B is Rs. 40. Formulate LPP to maximise the profit.
   iii. Solve the following linear programming problem graphically:
   Maximise $Z = 4x + 2y$.
   Subjected to the constraints,
   $x + y \leq 6$, $x + 3y \leq 12$, $x \geqslant 0$,$y \geqslant 0$.

iv. A 3 digit number is to be formed using the digits from 0 to 9. How many such numbers can be formed if the repetition of digit is
I) allowed , II) not allowed ?

v. Solve the following linear programming problem graphically:
Minimise $z = x + 2y$.
Subjected to the constraints,
$2x + y \geqslant 3$,
$x + 2y \geqslant 6$,
$x \geqslant 0, y \geqslant 0$.

SECTION-II

3. Attempt any **FOUR** questions from the following: (20)

i. Find the Median for the following data.

X	05-15	15-25	25-35	35-45	45-55	55-65
f	18	24	33	30	25	20

ii. Draw histogram for the following distribution on the graph paper.

Marks	0-10	10-20	20-30	30-40	40-50
No. of students	6	11	15	8	3

iii. Find the mean deviation from the mean for the following:

x	5	6	7	8	9	10
f	9	13	18	8	3	1

iv. The mean and standard deviation of a set of 10 values are 40 and 3 respectively. The mean and the standard deviation of another set of 5 values are 46 and 2 respectively . Find the mean and the standard deviation of the combined set of 15 values.

v. What are the merits and demerits of Mode and Qurtile Deviation.

4. Attempt any **FOUR** questions from the following: (20)

i. Two cards are drawn from pack of cards. Find the probability that
   (a) both are heart.
   (b) one is heart and other is spade.

ii. The letter of word ' REPETITION' are permuted .Find the probability that all T's are together.

iii. A box contains 36 tickets numbered 1 to 36 . One ticket is drawn at random. Find the probability that the number on the ticket is either divisible by 3 or 5.

iv. Define the following terms with examples.
   (a) Mutually Exclusive Events.
   (b) Exhaustive Events.
   (c) Independent Events.

v. Find expectation and variance for the following:

x	10	20	30	40	50
p	0.1	0.2	0.4	0.2	0.1

5. Attempt any **FOUR** questions from the following: (20)

i. Write a short note on ' Decision Tree'.

ii. Pay off of three act A_1,A_2,A_3 and state of nature P , Q , R are given below. Use EMV criterion and state the best course of action.

Sate of Nature	Pay-Off in Rs.			Probability
	Acts			
	A_1	A_2	A_3	
P	-60	-160	20	0.3
Q	40	80	-60	0.5
R	50	-50	120	0.2

iii. For the pay off matrix given below , find best course of action using:
(I) Maximin Criterion , (II) Maximax Criterion , (III) Minimax Regret Criterion.

Acts	Pay-Off in Rs.		
	State of Nature		
	S_1	S_2	S_3
A_1	50	-20	-25
A_2	80	70	80
A_3	30	140	50

iv. Conditional pay-off table for certain decision problem is as under.Find best decision using EOL Criterion.

Sate of Nature	Pay-Off in Rs.			Probability
	Acts			
	A_1	A_2	A_3	
S_1	100	80	-150	0.3
S_2	40	120	120	0.2
S_3	0	-50	80	0.3
S_4	-20	-100	80	0.2

v. For the following decision making problem , construct decision tree and find best course of action.

Course of Action	Pay-Off in Rs.		
	Sate of Nature		
	S_1	S_2	S_3
A_1	25	35	40
A_2	50	20	10
Probability	0.3	0.5	0.2

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