Maths

Time : 3 hours **Marks:100**

Note:

1) Use of simple calculator is allowed.

2) Answer to the both sections should be written separately in the same answer book.

SECTION-I

Q-1 Attempt any Four: **[20]**

[A] Shubha invested Rs. 83,845/- in Lotus India Mutual Fund when NAV was Rs.164/- with an entry load of 2.25%. She received a dividend of Rs. 16/- per unit. She, later sold all units of fund at NAV of Rs.208/- with some exit load. If her total gain including dividend was Rs.27,635/-, find exit load at which she sold the units.

[B] Mr. Kothari invested in systematic investment plan of a M.F., a fixed sum of Rs. 10,000/- on every month, for 4 months. The NAV on these dates were Rs.34.26, 46.12, 39.34 and 41.85. Entry load was 2.25% throughout the period. Find the average price, including the entry load, using the Rupee-Cost-Averaging Method. How does it compare with the A.M. of the prices?

[C] Find the face value of a share, if share purchased at a market price of Rs 180 each by investing Rs 4, 41,000 gave a total dividend of Rs 1470 at 6% rate of dividend.

[D] Mr. Kotian invested Rs.1, 20, 480/- to buy equity shares of company at M.P. of Rs. 480/-, at 0.4% brokerage. Find no. of shares he purchased.

[E] NAV of M.F. in the following case:

No. of units =10,000,

Market value of government securities =5, 00,000

Market value of corporate bonds=10, 00, 000, Other Assets=50, 000,

Liabilities of the fund=80,000, payable by the Fund=20,000.

Q-2 Attempt any Four: **[20]**

[A] **Formulate the following L.P.P. to maximise the profit:**

A machine is used for producing two products A and B. Product A is produced by using 3 units of chemical salt and 2 units of chemical mixture. Product B is produced by using 2 units of chemical salt and 4 units of chemical mixture. Only 1000 units of chemical salt and 1500 units of chemical mixture are available. The profit on product A is Rs.25 and on B it is Rs.20 per unit.

[B] Solve the following L.P.P. graphically.

Maximize $z = 5x + 7y$

Subject to $2x + 3y \leq 18$, $2x + y \leq 12$, $x, y \geq 0$

[C] How many 4 lettered different words can be formed by using the letters a, b c and d when repetition is not allowed.

[D] Solve the following L.P.P. graphically.

Minimize $z = 10x + 7y$

Subject to $2x + y \geq 2$, $x + 3y \geq 3$, $x, y \geq 0$

[E] In how many ways can 5 men, 4 women and 3 children be arranged for photograph so that all men are together and so are all women and children?

SECTION-II

Q-3 Attempt any Four: **[20]**

[A] Draw a histogram and hence the mode graphically:

Marks	20-30	30-40	40-50	50-60
No. of students	11	15	24	14

[B] Find the median for the following data.

Rainfall in cms	20-25	25-30	30-35	35-40	40-45	45-50	50-55
No. of Years	2	5	8	12	10	7	6

[C] The following are the runs scored by two batsmen A and B in 5 test matches. Calculate the coefficient of quartile deviation and decide who should be selected for the coming tour.

Runs by batsman A: 56, 58, 60, 62, 59
Runs by batsman B: 70, 62, 50, 35, 69

[D] There are two groups of workers with the following information, Find the combined average.

	Group I	Group II
Number	400	500
Average daily wage	Rs.50	Rs.41

[E] What is average and its important in statistics.

Q-4 Attempt any Four: **[20]**

[A] A room has 3 lamps. From a collection of 10 light bulbs of which 6 are not good, a person selects 3 at random and put them in the sockets. What is the probability that (1) he will have no light in room (2) he will have light from all the three lamps?

[B] There are 100 students in a class. 50 passes in Mathematics, 40 in Economics and 10 in both. A student is selected at random. What is the probability that he passed in (a) at least one subject? (b) in mathematics only subject only? (c) in at most one subjects?

[C] A survey of 50 students at XYZ College about the number of extracurricular activities resulted in the data shown.

Number of activities:	0	1	2	3	4	5	**Total**
Frequency :	8	20	12	6	3	1	**50**

Find the probabilities that a student selected at random participates: (a) in at least 2 activity (b) in 4 or more activities (c) in exactly 0 activities.

[D] In a game of throwing a fair dice, A wins Rs.60/-if a 6 is thrown. He gains Rs.30/- if the dice show 2 or 4 and he loses Rs.30/-if odd numbers occur on the uppermost face of the dice. Find the expected gain of A?

[E] State whether the following are statistical experiment or not.

(a) Tossing of a coin.
(b) Throwing a fair die.
(c) Measuring no. of hands of undergraduate students.
(d) Selecting a committee of three persons from a group of eight persons.
(e) Measuring density of pure gold.

Q-5 Attempt any Four: **[20]**

[A] A consumer goods company has set up the following pay off table for the sales returns of their product. Three strategies (A_1, A_2, A_3) are identifies to deal with three uncertain states of nature (S_1, S_2, S_3). You are required to identify right strategy under the following criteria: (1)Maximin (2) Maximax (3) Laplace Criteria

	S_1	S_2	S_3
A_1	7000	3000	1500
A_2	5000	4,500	0
A_3	3000	3000	3000

[B] A manager has to make a decision. He has four courses of actions A_1, A_2, A_3, A_4 There are four possible states of nature S_1, S_2, S_3, S_4. Advise the manager as to the best action by using Minimax regret criterion

States of Nature	Course of Action			
	A_1	A_2	A_3	A_4
S_1	15	1	8	9
S_2	9	10	10	10
S_3	6	8	10	11
S_4	5	7	5	12

[C] A farmer wants to decide which of the three crops he should plant on his farm. The profit from each is dependent on the rainfall during the season. He has categories the rainfall as substantial, moderate or light. He estimates his profit for each crop as shown in the table:

Course of action	Rainfall		
	Substantial	Moderate	Light
Crop A	7000	3500	1000
Crop B	2500	3500	4000
Crop C	4000	4000	3000

Depending on projection for the coming season, he estimates the probability of substantial rainfall as 0.2 of moderate rainfall, 0.3 and that of light rainfall as 0.5. Draw the tree diagram and determine the optimal decision as to which crop to plant using EMV criteria.

[D] A bakery man has observed the following demand pattern for cakes produced in his bakery:

No. of cakes in demand	20	21	22	23
Probability	0.05	0.25	0.30	0.40

The cost of producing one cake is Rs.12/- and the selling price is Rs.20/-per cake. Use EMV criterion to determine how many cakes should produce so as to maximize his profit

[E] Write short note on Decision tree.

.....