Time: 3 hrs.

Marks:100

Note:
1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Graph papers will be provided on request.
4. Use of simple six function calculator is allowed.

Section - I

Q.1 **Attempt the following. (Any four)** (20)

(A) If Mr. Patil wants to invest ▢7650 in share at market value ▢150 with brokerage 2% on it. Find number of shares purchased by him.

(B) Priya had 130 shares of a company of face value ▢100 each. Find the dividend she received when the company declared 8% dividend.

(C) A sum of ▢75,500 was invested in a mutual fund when NAV of ▢82. Find number of units purchased if entry load is 1.5%. Also find the current value of his investment if current NAV is ▢95.

(D) Radha invested ▢8000 and purchased 800 units of a mutual fund. Afterwards she redeemed all units when NAV was ▢17.2 with exit load 2.5%. Find the profit she earned for this transaction.

(E) Mr. Raj invested ▢5000 on first of every month for 5 months in SIP of mutual fund with NAV as ▢48.15, ▢52.83, ▢41.28, ▢35.44 and ▢32.65 respectively. There was no entry load charged. Find the Average price of units.

Q.2 **Attempt the following. (Any four)** (20)

(A) A box contains 6 white balls and 4 black balls. In how many ways can one select 3 white and 2 black balls from this box?

(B) In how many different ways can the letters of the word "THURSDAY" be arranged? How many of these arrangements begin with 'T'?

(C) Solve the following linear programming problem graphically

Maximize Z: $4x + 5y$

Subject to constraints $x + y \leq 5$

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

(D) Solve the following linear programming problem graphically

Minimize Z: $5x + 2y$

Subject to constraints $10x + 2y \geq 20$

$$5x + 5y \geq 30$$
$$x \geq 0, y \geq 0$$

(E) Two different kinds of food A and B are being considered to form a weekly diet. The minimum weekly requirements for fats, carbohydrates and protein are 18, 24 and 16 units respectively. One Kg. of food A has 4, 16 and 8 units respectively. One Kg. of food B has 12, 4 and 6 units respectively. The price of food A is ▢ 4 per Kg. And that of food B is ▢ 3 per Kg. Formulate the LPP to minimize the cost

Section - II

Q.3 **Attempt the following. (Any four)** (20)

(A) State merits and demerits of mean.

(B) Find out median for the following data.

Age in years	4-8	8-12	12-16	16-20	20-24
No. of Persons	6	10	18	30	16

(C) Draw a histogram for the following data and locate mode graphically.

Marks	10-30	30-50	50-70	70-90	90-110	110-130
No of students	4	10	14	12	8	6

(D) Find the semi-inter quartile range for the following data.

Class-interval	0-10	10-20	20-30	30-40	40-50	50-60
frequency	15	15	23	22	25	10

(E) Find the standard deviation from the following data.

Marks	0-20	20-40	40-60	60-80	80-100
No of students	10	23	30	26	11

Q.4   Attempt the following. (Any four)   (20)

(A) Define the following terms with examples
(i) Sample space   (ii) Complementary event
(B) A card is drawn from a well-shuffled pack of cards. Find the probability that it is
(i) Ace of spade (ii) A picture card
(C) If $P(A \cup B) = \frac{3}{5}$, $P(A') = \frac{2}{5}$, $P(B) = \frac{4}{7}$
Find (i) $P(A)$ (ii) $P(B')$ (iii) $P(A \cap B)$
(D) For the following probability distribution, obtain (i) $P(x \leq 1)$ (ii) $E(x)$

X	-2	-1	0	1	2	3
P(x)	0.1	0.2	0.2	0.3	0.15	0.05

(E) Six persons, including couple, are to be seated for a photograph in a row. Find the probability of a photograph in which the couple is seating together

Q.5   Attempt the following. (Any four)   (20)

(A) Explain the following terms
(i)Course of Action (ii) States of nature
(B) For the following pay-off table, find optimal decision using criterion
(I)Maximax (II) Maximin (III) Laplace

Course of Action	State of Nature		
	S_1	S_2	S_3
A_1	35	100	38
A_2	58	95	105
A_3	45	30	91

(C) Find the optimal decision using regret table and Minimax regret criterion

Course of Action	State of Nature		
	S_1	S_2	S_3
A_1	40	30	10
A_2	50	60	40
A_3	20	40	60

(D) For the following conditional pay off table, select best decision using EMV criterion

Act \ Event	S_1	S_2	S_3
A_1	14	16	10
A_2	12	15	16
A_3	20	18	14
Probability	0.4	0.3	0.3

(E) Draw decision tree for the following pay off table & determine the best possible act from it.

Act \ Event	S_1	S_2	S_3
A_1	20	35	30
A_2	15	40	45
A_3	10	25	15
Probability	0.25	0.45	0.3

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