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Max Marks: 100

Time: 3 Hrs.

- N.B. (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 non-programmable calculator is allowed

SECTION I

Q1. Attempt **any FOUR** from the following:

- a) Mr. Vijay invested in shares of face value Rs. 10. At 6% rate, he received a total dividend of Rs. 62.40. How many shares did he purchase? (5)
- b) A person sold 400 shares at Rs. 55 each paying 0.5% brokerage. What is net amount received by him? (5)
- c) Ms. Aayushi invested Rs. 18000 in a mutual fund when the NAV was Rs. 210.47 and redeemed all the units when the NAV was Rs.290.50. What was the total gain? What was the rate of return? There were no loads. (Number of units was rounded off upto 3 decimal places.) (5)
- d) Mr. Sachin invested Rs. 30,000 in a mutual fund on 03/05/10 when its NAV was Rs. 66.11. On 5/03/12, he received a dividend @ Rs. 5 per unit. Find the total dividend received by him, assuming no entry load. (5)
- e) An investor invested Rs. 4,000 on the 2nd of every month for 5 months in an SIP of a mutual fund. The N.A.V.s on these dates was Rs. 33.26, Rs. 28.25, Rs. 35.57, Rs. 38.45 and Rs. 44.32 respectively. There was same entry load of 2.22% for all these months. Find the average acquisition cost per unit. (5)

Q2. Attempt **any FOUR** from the following:

- a) In how many different ways can the letters of the word "FRIDAY" be arranged? Also find how many of these begin with D. (5)
- b) A group of 10 people contains 4 males and 6 females. A committee of 5 is to be formed, find the number of ways such that the committee has all females. (5)
- c) Solve the LPP graphically: (5)

$$\text{Max } Z = x + y$$

Subject to

$$2x + 3y \leq 12$$

$$2x + y \leq 8$$

$$x, y \geq 0$$

d) Solve the LPP graphically: (5)

$$\text{Min } Z = 7x + y$$

subject to

$$x + 4y \geq 4$$

$$3x + y \geq 3$$

$$x, y \geq 0$$

f) A diet of a sick person must contain atleast 4000 units of vitamins, 50 units of minerals and 1400 calories. Two foods F1 and F2 are available at cost of Rs.4 and Rs.8 per unit respectively. If one unit of F1 contains 200 units of vitamins, 2 units of minerals and 40 calories and one unit of F2 contains 1000 units of vitamins, 2 units of minerals and 20 calories.

Formulate the LPP to minimize the cost. (5)

SECTION II

Q3. Attempt **any FOUR** of the following:

a) State the different types of measures of dispersion. (5)

b) Calculate the mean and mode for the following data. (5)

Age in years	10	20	30	40	50
No. of Persons	6	11	20	15	8

c) The following data represents the marks of 150 students in a class. Calculate Q_1 & Q_3 and hence evaluate the coefficient of quartile deviation. (5)

Marks	0-20	20-40	40-60	60-80	80-100
No. of Students	23	37	50	24	16

d) The following distribution gives the weight of forty children living in a colony. Calculate the standard deviation for the given data. (5)

Weights in kgs.	5-10	10-15	15-20	20-25	25-30
No. of children	4	8	12	10	6

e) Calculate the combine mean of the two groups for the following data and hence check which group is more consistent. (5)

	Group I	Group II
Number	100	200
Mean	50	45
S.D.	5	3

Q.4 Attempt **any FOUR** of the following

a) One ticket is drawn at random from a set of 20 tickets numbered from 1 to 20. What is the probability that number of the ticket drawn is divisible by 2 or 3? (5)

b) If A and B are two independent events and $P(A) = \frac{2}{3}$, $P(B) = \frac{3}{5}$ Find $P(A')$ & $P(A \cup B)$. (5)
(where A' is complement of A)

c) Three unbiased coins are tossed at a time. Find the expected value of number of Heads. (5)

d) In a group of 125 students, 70 passed in mathematics, 55 passed in statistics and 30 passed in both. What is the probability that a student selected at random has passed (i) at least in one subject (ii) in only one subject. (5)

e) Explain Random variable, Probability distribution and its Expectation with suitable example. (5)

Q5. Attempt **any FOUR** of the following:

a) Explain the term 'Opportunity loss' in 'Decision theory'. Explain how the optimal decision is obtained with respect to 'Opportunity loss'? (5)

b) Solve the given decision problem using i) Maximax ii) Maximin criteria (5)

Events → Actions ↓	S ₁	S ₂	S ₃
A ₁	5	10	18
A ₂	8	22	8
A ₃	21	18	12
A ₄	30	7	19

c) Determine the best decision according to Minimax Regret criterion for the following payoff matrix: (5)

Events ↓ Action →	A	B	C
S1	10	12	25
S2	18	24	10
S3	25	30	20

d) Given the pay-off matrix, solve the decision problem using EMV criterion. (5)

Action	States of nature		
	E ₁	E ₂	E ₃
P	15	14	10
Q	13	15	12
R	17	16	25
Probability	0.5	0.4	0.1

e) Draw a decision tree for the given pay-off table and suggest the optimum decision. (5)

Type of Policy	Participation Level		
	High	Medium	Low
A	20	18	10
B	15	30	20
Probability	0.35	0.30	0.35

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