

Time: 3 Hrs.

Marks: 100

- 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

Q1. Attempt any four of the following.

- a) Sachin bought 120 shares at market value of Rs. 375 each and brokerage 0.4%. Calculate the sum he paid for the transaction. (5)
- b) If the market value of a share is Rs. 120, then how many shares can be purchased for Rs. 60180 with brokerage 0.3%? (5)
- c) Priya invested Rs. 20,000 in a mutual fund with NAV Rs. 15.75. find the number of units acquired by her if,
 i) there is no entry load ii) the entry load is 2%. (5)
- d) An investor sold 500 units of NAV Rs.230/- with exit load 2%. Find the sale value. (5)
- e) A person invested Rs. 6888 in a mutual fund and received 44.8 units. If the entry load is 2.5%, find the NAV at the time of purchase. (5)

Q2. Attempt any four of the following.

- a) A group contains 4 boys and 5 girls, out of these a committee of 2 boys and 3 girls is to be formed. find the number of ways, this can be done if
 i) There is no restriction on the selection. (5)
 ii) A particular boy is included. (5)
- b) In how many ways the letters of the word "COMPUTER" can be arranged so as to begin with a vowel & end with a consonant. (5)

- c) Solve the above L. P. Problem graphically.
 Maximize $Z = 9x + 13y$
 Subject to
 $2x + 3y \leq 18$
 $2x + y \leq 10$
 $x \geq 0, y \geq 0$ (5)

- d) Solve the above L. P. Problem graphically.
 Minimize $Z = 3x + 2y$
 Subject to
 $x + 2y \geq 6$
 $2x + y \geq 6$
 $x \geq 0, y \geq 0$ (5)

- e) A toy manufacturer produces toy cars & toy planes, each of which must be processed through two machines A & B. Machine A has maximum of 120 hours available & machine B has a maximum of 180 hours available. Manufacturing a car requires 6 hours in machine A & 3 hours of machine B. Manufacturing a plane requires 4 hours in machine A & 10 hours in machine B. If profits are Rs. 45 for a car and Rs. 55 for a plane, determine the number of cars and the number of planes that should be manufactured in order to maximize the profit.
Formulate the above problem mathematically as a linear programming problem. (5)

SECTION II

Q3. Attempt any FOUR of the following:

- a) State the merits and demerits of median. (5)
- b) Calculate the mean and mode for the following data. (5)

Age (years)	20-25	25-30	30-35	35-40	40-45	45-50
No. of Persons	10	15	33	22	10	10

- c) The following data represents the weights of students in a class. Calculate the quartile deviation for the same. (5)

Weights in kgs	30-40	40-50	50-60	60-70	70-80
No. of students	23	51	63	42	21

- d) The following data gives the frequency distribution of marks of children in a society. Calculate the standard deviation for the given data. (5)

Marks	0-10	10-20	20-30	30-40	40-50
No. of children	5	8	17	7	3

- e) The data given below is of marks secured by students of First year and Second year students of a College. Calculate the combine mean of the two groups. Also find which group is more variable (5)

	Group 1	Group 2
Number	100	200
Mean	50	60
S.D.	2	3

Q.4 Attempt any FOUR of the following.

- a) Explain the concept of Mutually Exclusive and Independent event in probability. (5)
- b) $P(A^c) = 2/3$, $P(A \cup B) = 5/12$, $P(B) = 1/4$, find $P(A)$ and $P(A \cap B)$
(where A^c is compliment of A) (5)
- c) Two cards are drawn from a well-shuffled pack of cards. What is the probability that
(i) both are black cards (ii) one is a king card and the other is an ace card. (5)
- d) The following is the probability distribution of number of hostesses reporting ill per day. (5)

Number	0	1	2	3	4	5
Probability	0.2	0.25	0.2	0.15	0.1	0.1

Find the average number of hostesses reporting ill per day.

- e) If two fair dice are rolled, find the probability that the sum of the numbers appearing on the uppermost face of the dice is a number divisible by 3. (5)

Q5. Attempt any FOUR of the following:

- a) Explain the following terms (5)
 - i) Course of Action (ii) Pay-off Matrix
- b) Solve the following decision problem using i) Maximax ii) Laplace Criterion (5)

Events → Action ↓	S_1	S_2	S_3
A_1	20	15	23
A_2	25	10	30
A_3	35	25	20

- c) Determine the best decision according to EOL criterion for the following pay-off table: (5)

State of Nature	Alternative			Probability
	A	B	C	
S_1	12	22	15	0.5
S_2	24	30	20	0.2
S_3	15	25	10	0.3

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

States of nature → Action ↓	S ₁	S ₂	S ₃
A ₁	25	12	15
A ₂	17	20	10
A ₃	15	10	13
Probability(E)	0.5	0.4	0.1

- e) Draw a decision tree for the pay-off table given below and suggest the type of biscuit that should be launched using EMV criterion. (5)

	Sales (in '000 Rs.)		
Type of Product	High	Average	Low
Creamy biscuit	20	30	50
Salty biscuit	30	25	35
Probability(demand)	0.3	0.5	0.2

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