

[Time:3.00 Hrs.]

[ Marks: 100]

Please check whether you have got the right question paper.

- N.B:
1. All questions are compulsory.
  2. Figures to the right indicate full marks.
  3. Use of non-programmable simple calculator is allowed.
  4. Graph paper will be provided on demand of student.
  5. Both the sections written on same answer sheet.

**Q.1 Attempt any FOUR of the following. (20)**

- a) Payal invested Rs. 4,000 on 3<sup>rd</sup> of every month for 6 months in a SIP of a M.F., with NAVs Rs. 18.12, 19.25, 20.85, 19.44, 18.96 and 19.58 respectively. The entry load was 2.25% throughout this period. Find average price, including entry and compare it with A.M. of prices.
- b) Smooth writing industry issued some shares of face value Rs. 10 each. A dividend of Rs. 7500 was declared by the company at 2.5% per share. Find number of shares issued by the company.
- c) Sukumar sold some shares at a market price of Rs. 120 each and paid 0.1% brokerage. He received a net amount of Rs. 47,952. Find the number of shares sold.
- d) Pracheen invested Rs. 20,000 on 25<sup>th</sup> January 2011 at NAV of 32.8. Afterwards, he redeemed all units on 23<sup>rd</sup> September 2011 with total gain of 1510.5. if entry and exit loads were 2.25% and 1% respectively, find the number of units and NAV at sales.
- e) Pankaj invested Rs. 30000 in a mutual fund when NAV was Rs. 25.54 with an entry load of 2.25%. Calculate the number of units. Also find the current value of his investment if the current NAV is Rs.28.32.

**Q.2 Attempt any FOUR of the following. (20)**

- a) Solve the following L.P.P. graphically.  
 Maximize  $Z = 2x + 3y$   
 Subject to  $x + y \leq 2$ ,  $3x + y \leq 4$ ,  $x \geq 0$ ,  $y \geq 0$

- b) Solve the following L.P.P. graphically.

$$\text{Minimize } Z = 13x + 15y$$

$$\text{Subject to } 3x + 4y \geq 360, 2x + y \geq 100, x \geq 0, y \geq 0$$

- c) There are 5 boys and 4 girls from whom a committee of 3 boys and 2 girls is to be formed. Find the number of ways in which this can be done, if a particular boy is to be excluded.
- d) A cracker manufacturer produces two types of crackers, rockets and bombs packed in boxes of hundred in its two factories. Factory 1 performs the basic assembly operation. Factory 2 performs the finishing operation. For financial reasons, Factory 1 has only 180 hours available per week and Factory 2 has 120 hours available. Factory 1 needs 3 hours on each box of rockets and 10 hours on each box of bombs. Factory 2 needs 6 hours on box of rockets and 4 hours on box of bombs. The profit of the company is Rs. 45 per box of rockets and Rs. 55 per box of bombs. Formulate the LPP to maximize the profit.
- e) How many numbers of 5 digits can be formed using the digits 1, 2, 3, 4, 5, 6 such that
- no digit is repeated.
  - repetition of digits is allowed

**Q.3 Attempt any FOUR of the following.****(20)**

- a) Find Mode for the following distribution.

| C.I. | 158–162 | 162–166 | 166–170 | 170–174 | 174–178 | 178–182 |
|------|---------|---------|---------|---------|---------|---------|
| f    | 3       | 7       | 12      | 15      | 6       | 2       |

- b) Find quartile
- $Q_1$
- for the following distribution.

| C.I. | 20–25 | 25–30 | 30–35 | 35–40 | 40–45 | 45–50 | 50–55 | 55–60 |
|------|-------|-------|-------|-------|-------|-------|-------|-------|
| f    | 30    | 50    | 40    | 180   | 150   | 20    | 70    | 60    |

- c) Find combined mean and standard deviation for the following data.

|             | BOYS | GIRLS |
|-------------|------|-------|
| Number      | 100  | 50    |
| Mean weight | 60   | 45    |
| S.D.        | 3    | 2     |

- d) Calculate mean deviation from the following data.

| Marks     | 0-5 | 5-10 | 10-15 | 15-20 | 20-25 |
|-----------|-----|------|-------|-------|-------|
| Frequency | 7   | 18   | 25    | 30    | 20    |

- e) Write merits of mean and median.

**Q.4 Attempt any FOUR of the following. (20)**

- a) How many words can be formed of the letters of the word “LOGARITHM” be arranged such that  
i] vowels are always together? ii] consonants are together and vowels are also together?
- b) Two fair dice are rolled. X denotes the sum of the numbers appearing on the uppermost faces of the dice. From the probability distribution of X, find  
i]  $P(X \text{ is a multiple of three})$  ii]  $P(X < 5)$
- c) A box contains 15 tickets numbered 1 to 15. A ticket is drawn at random from the box. Find the probability that the number on the ticket drawn is i] divisible by 3 ii] not divisible by 5.
- d) If  $(A \cup B) = \frac{5}{6}$ ,  $P(\overline{A}) = \frac{1}{3}$ ,  $P(B) = \frac{1}{2}$ , find  $P(\overline{B})$ ,  $P(A \cap B)$ .
- e) Define the following terms with examples:  
i) Complementary event ii) Sample space.

**Q.5 Attempt any FOUR of the following. (20)**

- a) For the following pay-off table select the best decision using EOL Criteria.

| Pay-off →   | State of nature |     |     |
|-------------|-----------------|-----|-----|
| Acts ↓      | S1              | S2  | S3  |
| A1          | 80              | 60  | 110 |
| A2          | 40              | 0   | 50  |
| A3          | 100             | -20 | 70  |
| Probability | 0.3             | 0.2 | 0.5 |

- b) Paratha packets are sold at Rs. 35 per packet with a cost of Rs. 20 per packet respectively, prepare the pay-off table for demand distribution as follows:

| Demand of No. of packets | 100 | 110 | 120  | 130  |
|--------------------------|-----|-----|------|------|
| Probability              | 0.2 | 0.3 | 0.35 | 0.15 |

- c) A manager has to make a choice from 3 available courses of action  $A_1$ ,  $A_2$  and  $A_3$ . There are 2 possible states of nature  $S_1$  and  $S_2$  with probabilities of occurrence as 0.7 and 0.3 respectively. For state  $S_1$ , the pay-off for three actions are Rs.25,000, Rs. 35,000 and Rs. 20,000 respectively. While for state  $S_2$ , the pay-offs are Rs. 45,000, Rs. 50,000 and 35,000 respectively. Represent the problem with help of a Decision Tree and suggest the most preferred decision and corresponding expected value.
- d) In the following matrix, the elements indicate the pay-offs to four available actions under each of five possible states of nature. Determine best decisions using

(i) Maximax criteria (ii) Laplace criteria

|           | States Of Nature |    |    |    |
|-----------|------------------|----|----|----|
| Acts<br>↓ | S1               | S2 | S3 | S4 |
| A1        | 25               | 35 | 75 | 0  |
| A2        | 15               | 55 | 0  | 45 |
| A3        | 0                | 10 | 30 | 30 |
| A4        | 30               | 0  | 65 | 25 |

- e) Define the following with examples: i) Acts ii) States of Nature

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