

[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.

SECTION I**Q.1 Attempt any four sub questions.**

- (a) Find the face value of a share if shares purchased at a market price of Rs. 280 each by investing Rs. 4,41,000 gave a total dividend of Rs. 1715 at 7% rate of dividend. **5**
- (b) Mrs. Sharma bought 250 shares of nominal value Rs. 100 each at Rs. 500 each and received an 8% dividend. Calculate her total dividend and rate of return on investment. **5**
- (c) Mr. Kunal purchased 320 Rs. 100 shares 50% above par. After getting 8% dividend, he sold all of them 60% above par. The brokerage was 0.3% for the purchase and 0.2% for the sale. What was his total gain? Find the rate of return on investment. **5**
- (d) Mr. Rohit invested Rs.50,000 in a mutual fund scheme with entry load of Rs. 1.25% at NAV Rs.200. How many units (rounded off to 3 decimal places) did he purchase? The current NAV is Rs.230. Find the current value of his investment. **5**
- (e) Mrs. Mohini invested Rs.20,000 in a mutual fund on 10/08/2015 at an NAV of Rs. 43.378 and redeemed all units on 12/12/2016 when NAV was Rs. 56.784 (Taking all values correct up to 3 decimal places). Find her total gain and the rate of return on investment. **5**

Q.2 Attempt any four sub questions.

- (a) In how many ways can 7 Indians, 3 Sri Lankans and 4 Nepalese be arranged in a row for a photograph so that the persons from the same country are all together? **5**
- (b) Out of 15 students, a Cultural Committee of 3 students and a Students' Council of 5 students is to be formed at random. [No student will be common to both.] (i) In how many different ways can it be done if there is no any restriction? (ii) In how many different ways can it be done if one particular student must be included in cultural committee? **5**
- (c) Solve by graphical method **5**
- Maximize $Z=190x + 130y$ Subject to: $2x+3y \leq 18$, $2x+y \leq 10$, $x \geq 0$, $y \geq 0$.

- (d) Solve by graphical method 5

Minimize $Z=130x + 270y$ Subject to: $x + 2y \geq 30$, $3x + y \geq 30$, $x \geq 0$, $y \geq 0$.

- (e) “The daily requirement of proteins and carbohydrates per person is at least 15 units and 29 units respectively. Food I contain 1 unit of proteins and 2 units of carbohydrates per packet. Food II contains 2 unit of proteins and 3 units of carbohydrates respectively per serving. The cost of Food I and Food II is Rs. 30 and Rs. 38 per serving respectively” 5

Formulate above information as the Linear Programming Problem to minimize cost of servings of foods.

SECTION II

Q.3 Attempt any four sub questions

- (a) Find the mean wages of workers for the following data. 5

Wages in hundred Rs.	10-20	20-30	30-40	40-50	50-60
No. of workers	2	5	10	7	3

- (b) Find the median age from the following data. 5

Age in years	10-20	20-30	30-40	40-50	50-60
No. of persons	20	70	100	50	30

- (c) Draw histogram and locate modal marks for the following data. 5

Marks	50-60	60-70	70-80	80-90	90-100
No. of students	130	150	200	170	150

- (d) Calculate Quartile Deviation from the following data. 5

Class Interval	0-10	10-20	20-30	30-40	40-50
Frequency	10	25	40	30	15

- (e) Calculate the mean and standard deviation when group I and II are combined: 5

	Group I	Group II
Number of Observations	60	50
Arithmetic Mean	70	90
Standard Deviation	3	4

Q.4 Attempt any four sub questions

- (a) If three coins are tossed simultaneously find the probability of getting
(i) exactly one head (ii) at least two heads. 5
- (b) A ticket is drawn from 65 lottery tickets numbered from 1 to 65. Find the probability that the number on the ticket is divisible by 3 or 5. 5
- (c) In a group of 1000 persons, 900 like sweet food items, 200 like sour food items and 125 like both. A person is selected at random. Find the probability that the person (i) likes sweet food items or sour food items or both. (ii) likes neither. 5
- (d) The probability that Arun can solve a mathematics problem is 0.7 and the probability that Bina can solve it is 0.6. If both try independently, find the probability that
(i) both solve the problem (ii) the problem is solved (iii) the problem is not solved 5
- (e) Find E(X) and V(X) for the following probability mass function of a Random Variable X. 5

x	10	20	30	40
P(X=x)	0.2	0.3	0.4	0.1

Q.5 Attempt any four sub questions

- (a) From the following pay-off table, suggest best course of action to be taken using (i) Maximin (ii) Maximax (iii) Laplace criterion. 5

State of nature	Course of action		
	A1	A2	A3
S1	150	140	155
S2	130	165	160
S3	170	155	185

- (b) A businessman wishes to produce and sell one of 3 types of toys. From the following pay-off table, decide on the type to be produced, using Minimax Regret criterion. 5

Demand	Type of Toy		
	Type A	Type B	Type C
Low	20	16	12
Moderate	21	22	15
High	23	24	30

- (c) From the following pay-off table, decide on the best investment alternative for an entrepreneur by calculating Expected Monetary Values (EMV).5

Demand	Probability	Investment Alternative			
		A1	A2	A3	A4
Low	0.1	35	40	45	30
Medium	0.5	45	50	50	45
High	0.4	55	55	60	65

- (d) Draw the decision tree and obtain the optimum investment alternative from the following payoff table.5

State of Economy	Probability	Investment Alternative			
		A1	A2	A3	A4
S1	0.2	400	400	500	300
S2	0.5	300	500	500	400
S3	0.3	500	500	600	700

- (e) From following pay off table, decide on the number of umbrellas should be kept in stock, by calculating Expected Opportunity Loss (EOL).5

State of the rainy season	Probability	Number of umbrellas in stock		
		200	250	300
Light	0.2	3000	2700	2400
Medium	0.5	3000	3400	3400
Severe	0.3	3500	4000	5000
