

Max. Marks: 100

Time: 3 Hrs.

- N.B.**
1. All questions are compulsory
 2. Figures to the right indicate marks allotted
 3. Graph papers will be provided on request
 4. Use of simple non-programmable calculator is allowed

SECTION-I

Q.1 Attempt any 4 from the following:

- a) Find the face value of a share if an investment of Rs. 9,00,000 put in to purchase 8% shares quoted at Rs. 15 each, earned a total dividend of Rs. 9600. (5)
- b) Mr. Chopra bought 400 shares of par value Rs. 10 each at the market price of Rs. 24 each. If the annual dividend distributed was at the rate of 12%, find Mr. Chopra's total dividend and rate of return on investment. (5)
- c) Ram invested Rs 18,000 in a mutual fund scheme with entry load of 2.25% at NAV Rs 110. How many units did he purchase? The current NAV is Rs 130. Find the current value of his investment. (5)
- d) Katrina invested Rs. 15,000 on 5th of every month for 5 months in a SIP of a mutual fund. The N.A.V.s on these dates were Rs. 42.26, Rs. 40.25, Rs. 49.57, Rs. 51.45 and Rs. 39.32 respectively. There was same entry load of 2.3% for all these months. Find the average acquisition cost per unit. (5)
- e) Mr. Bhavesh invested Rs. 50000/- in the purchase of Mutual fund units at NAV Rs. 16.50/-. Calculate the number of units purchased when the entry load of 1.2% was applied. How many more units he could have purchased if the scheme was load free? (5)

Q.2 Attempt any 4 from the following:

- a) In how many different ways can the letters of the word 'LEADING' be arranged such that the vowels should always come together? (5)
- b) A committee of 5 persons is to be formed from 6 doctors and 5 nurses .Find the total number of ways if committee consist of i) All doctors. ii) 3 doctors and 2 nurses. (5)
- c) Solve the following L.P.P. by graphical method.
 Maximize $Z = 4x + 5y$
 Subject to, $2x + 3y \leq 12$;
 $x + y \leq 5$; $x \geq 0, y \geq 0$ (5)
- d) Solve the following L.P.P. Graphically: (5)
 Minimize $Z = 9x + 10y$,
 subject to, $x + 2y \geq 30$,
 $3x + y \geq 30$, $x \geq 0, y \geq 0$

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- e) A printing company prints two types of magazines A and B. The company earns Rs. 25 and Rs. 35 on each copy of magazines A and B respectively. The magazines are processed on three machines. Magazine A requires 2 hours on machine I, 4 hours on machine II and 2 hours on machine III. Magazine B requires 3 hours on machine I, 5 hours on machine II and 3 hours on machine III. Machines I, II, and III are available for 35, 50, and 70 hours per week respectively. Formulate the L.P.P. so as to maximize the total profit of the company. (5)

SECTION-II

Q.3 Attempt any 4 from the following:

- a) Explain the measure of central tendency. State the requisites of good average. (5)
- b) Draw a less than cumulative frequency curve for the following data and locate median and two quartiles graphically. (5)

Daily Wages	0-100	100-200	200-300	300-400	400-500	500-600
No. of workers	10	30	45	60	35	20

- c) Find mean and mode from the following data. (5)

Age in years	0-20	20-40	40-60	60-80	80-100
No. of persons	4	5	15	11	5

- d) Find coefficient of variation from the following data. (5)

Age in years	10-20	20-30	30-40	40-50	50-60
No. of mobile users	8	12	20	14	10

- e) The following data gives the distribution of weights of boys and girls in the class. Find, combine arithmetic mean and decide which group is more consistent. (5)

	Boys	Girls
Number	55	65
Mean weight	58 kgs	44 kgs
S.D	3 kgs	2 kgs

Q.4 Attempt any 4 from the following:

- a) Define the following terms with examples:
(i) Sample space (ii) Mutually exclusive events. (5)
- b) Given $P(A) = 0.5$, $P(B) = 0.4$ & $P(A/B) = 0.25$
Find, (i) $P(\bar{B})$ (ii) $P(A \cap B)$ (iii) $P(A \cup B)$ (5)
- c) A box contains 4 blue, 3 red and 2 black balls. If two balls are selected at random from the box, what is the probability that one is blue and one is red ball? (5)

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- d) A problem on Mathematics is given to 2 students A and B who attempt it independently. Their chances of solving the problem are $\frac{1}{3}$ and $\frac{3}{4}$ respectively. What is the probability that,
(i) the problem is solved? (ii) it is solved by only one? (5)
- e) Following is the probability distribution of number of smart phones sold in a shop per day.

Number	0	1	2	3	4	5
Probability	K	0.3	0.15	0.15	0.1	2k

Find the value of k and $E(X)$. (5)

Q.5 Attempt **any 4** from the following:

- a) Write a note on Decision Tree. (5)
- b) Given the following pay off table, find optimal decision using
(i) Laplace criterion (ii) Maximax criterion (iii) Maximin criterion (5)

Course of Action	States of Nature		
	S1	S2	S3
A1	65	45	30
A2	75	25	105
A3	90	70	75

- c) A physician purchases a particular vaccine on Monday of each week. The vaccine must be used within the week following, otherwise it becomes worthless. The vaccine cost Rs. 20 per dose and the physician charges Rs. 50 per dose. In the past 50 weeks, the physician has administered the vaccine in the following quantities.

Doses per week	20	30	40
No. of weeks	5	25	20

- (i) Construct pay-off table (ii) Determine the optimum number of doses the physician should buy using EMV criterion. (5)
- d) For the following pay-off table, select best decision using EOL criterion. (5)

State of nature	Acts			Probability
	A ₁	A ₂	A ₃	
S ₁	80	40	100	0.3
S ₂	60	0	-20	0.2
S ₃	110	50	70	0.5

- e) Draw a decision tree for the decision problem below and suggest the optimal choice. (Use EMV criteria) (5)

Product option	Market demand		
	Poor	Average	Good
P	100	350	100
Q	150	250	150
Probability	0.3	0.55	0.15