

031222
VCD: _____ FYBCOM SEM-I Mathematical and Statistical Techniques 3hrs Marks: 100

Note: 1. All Questions are compulsory.

2. All questions carry equal 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 of the following:

a) Mr. Pawar brought 200 shares of face value Rs. 10 each at the market price of Rs. 45 each.

If company declare 28% dividend. Find total dividend and rate of return on investment. 5

b) Rakesh purchase 85 shares whose market value is Rs.75 each if company declare 2 bonus shares for every 5 shares after that he sold it at Rs.65 each. How much he did gain or loss in this transaction. 5

c) Find amount required to purchase 250 share, at discount 15% with face value 100 and brokerage at 0.4% ? 5

d) Deepak purchased some units in a open-end fund at Rs. 45 and its N.A.V. after 15 months was Rs. 58. Find the annualized change in N.A.V. as a percentage. 5

e) Mr. Patil invested Rs.15000 on 5th of every month for 5 months in a SIP of a mutual fund. The NAVs on these dates were Rs.42, 40, 49, 51 & 47 respectively. There was same entry load of 2% for all these months. Find the average price, including the entry load, using rupee cost averaging method. 5

Q.2 Attempt any Four of the following:

a) How many four digit numbers can be formed with the digits 0,1,2,3,4,5,6,7,8,9 if

i) no digit is repeated in the same number, ii) repetition of digits is allowed? 5

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- b) Four students and two professors are to be seated on chairs in a row, for a photograph. Find the number of possible arrangements in which, i) the two professors always sit next to each other, ii) The two professors occupy seats at the two ends of the row. 5
- c) From a group of 7 boys and 5 girls a committee of 4 is to be formed. In how many ways can this be done? If the committee is to include. i) exactly 3 girls, ii) No girls. 5
- d) Two different kinds of food A and B are to be considered to form a weekly diet. The minimum weekly requirements for fats, carbohydrates and proteins are 12, 30 and 20 units respectively. One Kg. of food A has 2, 16, and 4 units respectively of these ingredients and one Kg. of food B has 6, 4 and 3 units respectively. If the cost per Kg. of food A is Rs.75, per Kg. of food B is Rs.80. Construct the problem to minimize the cost. 5
- e) Solve the following L.P.P Graphically. 5
- Maximize $Z = 6x + 4y$ Subject to $x + 2y \leq 8$, $3x + 2y \leq 12$, $x \geq 0$, $y \geq 0$.

Section-II

Q.3 Attempt any FOUR of the following:

- a) Write merit and demerit of Median. 5
- b) The mean wage of 100 workers in a factory running two shifts of 60 and 40 workers respectively is Rs. 38. The mean wage of 60 workers working in the morning shift is Rs. 40. Find the mean wage of the 40 workers working in the evening shift. 5
- c) Draw histogram for the following data & hence obtain Mode from it. 5
- | Daily wages in Rs. | 200-400 | 400-600 | 600-800 | 800-1000 | 1000-1200 | 1200-1400 |
|--------------------|---------|---------|---------|----------|-----------|-----------|
| No. of workers | 8 | 15 | 22 | 15 | 13 | 7 |
- d) Calculate Mean Deviation from median for the following data: 5
- 52, 61, 40, 62, 47, 61, 56.

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e) Calculate standard deviation for the following data:

5

Marks	0-10	10-20	20-30	30-40	40-50
No. of students	4	10	16	12	8

Q.4 Attempt any Four of the following:

a) Explain the following term with example:

5

i) Sample Space ii) Probability

b) Two cards are drawn at random from well pack of cards. Find the probability that cards are

i) one red and one black, ii) both are black.

5

c) In a group of 80 students 30 like western music 40 like Indian music and 10 like both.

Find the probability that a students selected at random likes at least one of the two types of music.

5

d) The probability distribution of daily demand of cell phones in a mobile gallery is given below.

Find the mean and variance.

5

Demand	5	10	15	20
Probability	0.4	0.2	0.3	0.1

e) For the following probability distribution.

5

X	-1	0	1	2	3	4
P(x)	0.2	0.15	0.25	K	0.05	0.35

Find (i)k, (ii) $P(x \geq 2)$, (iii) $P(0 \leq x < 4)$.

Q.5 Attempt any Four of the following:

a) Write short note on decision tree and procedure of drawing decision tree.

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- b) A company wants to launch a new drink this summer. From the following pay-off table. Decide the flavour to be launched using (i). Maximin, (ii). Maximax,

Summer condition	Flavour of the soft drink		
	Orange	Mango	Lime
Mild	150	58	59
Moderate	153	151	154
Severe	158	230	198
Very severe	250	268	278

- c) The following is the demand distribution of a certain perishable product.

No. of units demanded	10	11	12
Probability	0.3	0.5	0.2

If the product is sold at Rs.80 per unit with cost price of Rs.60 per unit, unsold product is wasted. Decide the best decision using EMV criterion.

- d) Find the best decision by using EOL criterion for the following pair of Matrix.

State of nature	Decisions			
	A1	A2	A3	probability
S1	20	30	10	0.5
S2	60	40	30	0.3
S3	30	70	40	0.2

- e) The following pay of matrix has been formed by portfolio manager giving pay-offs for different modes of investment under different states of the economy. Decide on the best mode of investment by calculating expected monetary values (EMV).

State of economy	Probability	Investment alternative			
		Gov. F.D	Company F.D	Mutual fund	Suares
Depression	0.25	100	90	50	0
Recovery	0.45	100	110	120	140
Prosperity	0.30	100	120	150	200