



## SIDDHIKSHA EDUCATION CARE 2024-25

BUSINESS MATHEMATICS

XII STD

2 MarksChapter 10

- 10.1 1. Write mathematical form of transportation problem.
- 10.1 2. What do you mean by balanced transportation problem?
- 10.2 3. What is the Assignment problem?
- 10.2 4. What is the difference between Assignment Problem and Transportation problem?
- 10.1 5. What is transportation problem?

Chapter 9.

- 9.3 1. Mention the types of causes for variation in a production process.
- 9.3 2. What do you mean by Product control?
- 9.3 3. Define Mean chart.
- 9.3 4. What are the uses of statistical quality Control.
- 9.3 5. Mention the classification of Index Number.
- 9.2 6. State the test of adequacy of index number.
- 9.2 7. Define true value ratio
- 9.2 8. state the uses of Cost of Living Index Number.
- 9.2 9. Define Seasonal index.
- 9.1 10. What is the need of studying time series?
- 9.1 11. Define Secular trend.
- 9.1 12. Explain the method of fitting a straight line.
13. Example 9.1 and 9.3.

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## Chapter 8

- 8.2 1. What is interval estimation?
- 8.2 2. Define Critical region.
- 8.2 3. Define level of significance.
- 8.2 4. What is single tailed test.
- 8.1 5. What is statistic?
- 8.1 6. What is Sampling distribution of a statistic?
- 8.1 7. state any two merits of simple random sampling.
- 8.1 8. state any two merits of systematic random sampling.
9. Encomple 8.2, 8.6 and 8.10.

## chapter 7.

- 7.3 1. Write down the conditions in which the Normal distribution is a limiting case of binomial distribution.
- 7.2 2. Define poisson distribution.
- 7.2 3. Mention the properties of poisson distribution.
- 7.1 4. Write down the conditions for which the binomial distribution can be used.
- 7.1 5. If the probability of success is 0.09, how many trials are needed to have a probability of atleast one success as  $\frac{1}{3}$  or more?
- 7.1 6. The mean of a binomial distribution is 5 and standard deviation is 2. Determine the distribution.
7. Encomple 7.3, 7.5 and 7.15.

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## Chapter 6

- 6.1.1. Two coins are tossed simultaneously. Getting a head is termed as success. Find the probability distribution of the number of successes.
- 6.1.2. Define random variable
- 6.1.3. Define discrete random variable.
- 6.1.4. Explain the distribution function of a random variable.
- 6.2.5. Let  $X$  be a random variable defining number of students getting A grade. Find the expected value of  $X$  from the given table.
- |          |     |     |     |     |
|----------|-----|-----|-----|-----|
| $X = x$  | 0   | 1   | 2   | 3   |
| $P(X=x)$ | 0.2 | 0.1 | 0.4 | 0.3 |
- 6.2.6. In an investment, a man can make a profit of 5000 with a probability of 0.62 or a loss of Rs. 8000 with a probability of 0.38. Find the expected gain.
- 6.2.7. Define Mathematical expectation in terms of discrete random variable.
- 6.2.8. Let  $X$  be a random variable and  $Y = 2X + 1$ . What is the variance of  $Y$  if variance of  $X$  is 5?
9. Example 6.1, 6.10, 6.13 and 6.15

## Chapter 5

1. Example 5.6

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### chapter 4.

H.5 1. Solve :  $\frac{d^2y}{dx^2} - 4\frac{dy}{dx} + 4y = 0$

H.5 2. solve :  $\frac{d^2y}{dx^2} - 2k\frac{dy}{dx} + k^2y = 0$

H.5 3. solve :  $\frac{d^2y}{dx^2} + 16y = 0$

H.2 4. solve :  $y dx - x dy = 0$

H.1 5. Find the order and degree of  $(2-y'')^2 = y''^2 + 2y'$

H.1 6. Find the order and degree of  $\left(\frac{dy}{dx}\right)^3 + y = x - \left(\frac{dx}{dy}\right)$

H.1 7. Find the differential equation of  $xy = c^2$

H.1 8. Find the differential equation of  $x^2 + y^2 = a^2$

9. Example 4.6, 4.25 and 4.27.

### chapter 3

3.1 1. Find the area bounded by the lines  $y = 2x + 4$ ,  $y = 1$ ,  $y = 3$  and the y-axis.

2. Example 3.2 and 3.3.

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## Chapter 2

2.10 1. Evaluate :  $\Gamma\left(\frac{9}{2}\right)$

2.10 2. Evaluate :  $\int_0^{\infty} e^{-4x} \cdot x^4 dx$

2.7 3. Integrate.  $\frac{1}{9-16x^2} dx$

2.7 4. Integrate :  $\frac{1}{\sqrt{9x^2-7}} dx$

2.7 5. Integrate :  $\sqrt{4x^2-5} dx$ .

2.6 6. Integrate :  $\frac{e^{2x}}{e^{2x}-2} dx$ .

2.6 7. Integrate :  $\frac{6x+7}{\sqrt{3x^2+7x-1}} dx$

2.6 8. Integrate :  $x^8 (1+x^9)^5 dx$

2.6 9. Integrate :  $\frac{1}{x \log x} dx$ .

2.4 10. Integrate :  $\sqrt{1-\sin 2x} dx$

2.1 11. Integrate :  $(3+x)(2-5x) dx$

12. Example 2.23, 2.10, 2.17, 2.21, 2.32, 2.40, 2.46, 2.53, 2.71, 2.74 (ii), 2.76 and 2.77 (iii).

## Chapter 1

1.1 1. Find the rank of  $\begin{pmatrix} 1 & 4 \\ 2 & 8 \end{pmatrix}$

2. Example 1.2

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BUSINESS MATHEMATICS

3 Marks

chapter 1

- 1.1 1. Find the rank of  $\begin{pmatrix} 1 & 2 & -1 & 3 \\ 2 & 4 & 1 & -2 \\ 3 & 6 & 3 & -7 \end{pmatrix}$
- 1.1 2. Find the rank of  $\begin{pmatrix} 3 & 1 & -5 & -1 \\ 1 & -2 & 1 & -5 \\ 1 & 5 & -7 & 2 \end{pmatrix}$
- 1.2 3. Solve by cramer's rule  $5x + 3y = 17$ ,  $3x + 7y = 31$ .
- 1.2 4. A commodity was produced by using 3 units of labour and 2 units of capital, the total cost is Rs. 62. If the commodity had been produced by using 4 units of labour and one unit of capital, the cost is Rs. 56. What is the cost per unit of labour and capital? (Use determinant method).
5. Enemple 1.4, 1.7, 1.9, 1.11, 1.19, 1.21, 1.25 and 1.27
- 1.3 6. The subscription department of a magazine sends out a letter to a large mailing list inviting subscriptions for the magazine. Some of the people receiving this letter already subscribe to the magazine while others do not. From this mailing list, 45% of those who already subscribe will subscribe again while 30% of those who do not know subscribe will subscribe. On the last letter, it was found that 40% of those receiving it ordered a subscription. What percent of those receiving the current letter can be

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expected to order a subscription?

## chapter 2

2.2 1. Integrate:  $\int \frac{x^3}{x+2} dx.$

2.2 2. If  $f'(x) = \frac{1}{x}$  and  $f(1) = \frac{\pi}{4}$  then find  $f(x)$

2.3 3. Integrate:  $\frac{a^x - e^{x \log b}}{e^{x \log a} - b^x} dx.$

2.3 4. Integrate:  $\frac{e^{3x} + e^{5x}}{e^x + e^{-x}} dx.$

2.3 5. If  $f'(x) = e^x$  and  $f(0) = 2$  then find  $f(x)$ .

2.5 6. Integrate  $x \log x dx$

2.5 7. Integrate  $x^5 e^{x^2} dx$

2.7 8.  $\int \frac{1}{x^2 - x - 2} dx.$

2.7 9. Integrate:  $\frac{e^x}{e^{2x} - 9} dx.$

2.7 10.  $\int \frac{1}{\sqrt{x^2 - 3x + 2}} dx$

2.7 11.  $\int \frac{1}{x + \sqrt{x^2 - 1}} dx.$

2.9 12. Evaluate:  $\int_{-1}^1 \log \left( \frac{2-x}{2+x} \right) dx.$

13. Enemple 2.6, 2.11, 2.13, 2.24, 2.26, 2.29, 2.35, 2.38  
2.44, 2.57, 2.63, 2.68, 2.70, 2.72, 2.74(v) and  
2.80 (iv)

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2.10 14. If  $f(x) = \begin{cases} x^2 e^{-2x}, & x \geq 0 \\ 0, & \text{otherwise} \end{cases}$  then evaluate.

$$\int_0^{\infty} f(x) dx.$$

### chapter 3.

- 3.21 1. If  $MR = 14 - 6x + 9x^2$ , find the demand function.
- 3.22 2. The marginal cost function of a commodity is given by  $MC = \frac{14000}{\sqrt{7x+4}}$  and the fixed cost is Rs. 18000. Find the total cost and average cost.
- 3.23 3. If the marginal revenue function is  $R'(x) = 1500 - 4x - 3x^2$ . Find the revenue function and average revenue function.
- 3.24 4. If the marginal cost function of  $x$  units of output is  $\frac{a}{\sqrt{bx+c}}$  and if the cost of output is zero. Find the total cost as a function of  $x$ .
- 3.25 5. The marginal revenue (in 1000) functions for a particular commodity is  $5 + 3e^{-0.03x}$ , where  $x$  denotes the number of units sold. Determine the total revenue from the sale of 100 units. (Given  $e^{-3} = 0.05$  approximately)
- 3.26 6. The marginal cost function of a product is given by  $\frac{dc}{dx} = 100 - 10x + 0.1x^2$  where  $x$  is the output. obtain the total and the average cost function of the firm under the assumption, that is fixed cost is Rs. 500.

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- 3.3 7. The demand function  $P = 85 - 5x$  and supply function  $p = 3x - 35$ . Calculate the equilibrium price and quantity demanded. Also calculate consumer's surplus.
- 3.3 8. Calculate the producer's surplus at  $x=5$  for the supply function  $p = 7 + x$ .
9. Example 3.10, 3.12, 3.15, 3.22, 3.24 and 3.28.
- 3.3 10. The demand and supply functions under perfect competition are  $P_d = 1600 - x^2$  and  $P_s = 2x^2 + 400$  respectively. Find the producer's surplus.

### chapter 4.

- H.2 1. Solve:  $y(1-x) - x \frac{dy}{dx} = 0$
- H.2 2. solve:  $\cos x (1 + \cos y) dx - \sin y (1 + \sin x) dy = 0$
- H.2 3. Find the curve whose gradient at any point  $P(x, y)$  on it is  $\frac{x-a}{y-b}$  and which passes through the origin.
- H.4 4. solve:  $\frac{dy}{dx} + y \cos x = \sin x \cos x$
- H.5 5.  $(D^2 - 2D - 15)y = 0$  given that  $\frac{dy}{dx} = 0$  and  $\frac{d^2y}{dx^2} = 2$  when  $x=0$ .
6. Example H.4, H.9, H.12, H.20 and H.29.
- H.5 7.  $(HD^2 + HD - 3)y = e^{2x}$

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## chapter 5

5.1.1. If  $y = x^3 - x^2 + x - 1$  calculate the values of  $y$  for  $x = 0, 1, 2, 3, 4, 5$  and form the forward differences table.

5.1.2. If  $f(x) = x^2 + 3x$  then show that  $\Delta f(x) = 2x + 4$ .

5.1.3. Following are the population of a district

Year (x)	1881	1891	1901	1911	1921	1931
Population (y)	363	391	421	-	467	501

Find the population of the year 1911.

4. Example 5.2, 5.8, 5.10 and 5.12.

## chapter 6

6.1.1. The discrete random variable  $X$  has the following probability function

$$P(X=x) = \begin{cases} kx & x = 2, 4, 6 \\ k(x-2) & x = 8 \\ 0 & \text{otherwise} \end{cases}$$

where  $k$  is a constant. show that  $k = 1/18$ .

6.1.2. Explain the terms (i) Probability mass function (ii) probability density function and (iii) probability distribution function.

6.1.3. State the properties of distribution function.

6.2.4. A person tosses a coin and is to receive Rs. 4 for a head and is to pay Rs. 2 for a tail.

Find the expectation and variance of his gains

5. Example 6.16, 6.19 and 6.22.

6.2.6. In a business venture a man can make a profit

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of Rs. 2000 with a probability of 0.4 or have a loss of Rs. 1000 with a probability of 0.6. What is his expected, variance and standard deviation of profit?

## chapter 7

- 7-1 1. Defects in yarn manufactured by a local mill can be approximated by a distribution with a mean of 1.2 defects for every 6 metres of length. If lengths of 6 metres are to be inspected, find the probability of less than 2 defects.
- 7-1 2. Among 28 professors of a certain department, 18 drive foreign cars and 10 drive local made cars. If 5 of these professors are selected at random, what is the probability that at least 3 of them drive foreign cars?
- 7-1 3. Determine the binomial distribution for which the mean is 4 and variance 3. Also find  $P(X=15)$
- 7-1 4. Consider five mice from the same litter, all suffering from Vitamin A deficiency. They are fed a certain dose of carrots. The positive reaction means recovery from the disease. Assume that the probability of recovery is 0.73. What is the probability that at least 3 of the 5 mice recover.
5. Example 7.4, 7.7, 7.10, 7.13, 7.19, 7.24, 7.27 and 7.31.
- 7-2 6. Assuming that a fatal accident in a factory during the year is  $1/1200$ , calculate the

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probability that in a factory employing 300 workers there will be atleast two fatal accidents in a year. (given  $e^{-0.25} = 0.7788$ ).

## Chapter 8

8.1.1. Explain in detail about non-sampling error.

8.1.2. Using the following Tippet's random number table

2952	6641	3992	9792	7969	5911	3170
4167	9524	1545	1396	7203	5356	1300
2670	7483	3408	2762	3563	1089	6913
0560	5246	1112	6107	6008	8125	4233
2754	9143	1405	9025	7002	6111	8816

Draw a sample of 10 three digit numbers which are even numbers.

8.1.3. A sample of 1000 students whose mean weight is 119 lbs (pounds) from a school in Tamil Nadu state was taken and their average weight was found to be 120 lbs with a standard deviation of 30 lbs. Calculate standard error of mean.

4. Example 8.4, 8.7 and 8.9

8.2.5. A sample of 100 items, drawn from a universe with mean value 4 and S.D 3, has a mean value 3.5. Is the difference in the mean significant at 0.05 level of significance?

## Chapter 9

9.1.1. Write a brief note on seasonal variations.

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9.1 2. State the different methods of measuring trend.

9.1 3. Find the trend of production by the method of a five-yearly period of moving average for the following data:

Year	1979	1980	1981	1982	1983
Production ('000)	126	123	117	128	125
	1984	1985	1986	1987	1988
	124	130	114	122	129
					1989
					118
					1990
					123

9.2 4. Calculate by a suitable method, the index number of price from the following data:

Commodity	2002		2012	
	Price	Quantity	Price	Quantity
A	10	20	16	10
B	12	34	18	42
C	15	30	20	26

9.2 5. The following are the group index numbers and the group weights of an average working class family's budget. Construct the cost of living index number.

Groups	Food	Fuel	clothing	Rent	Misc.
Index Number	2450	1240	3250	3750	4190
Weight	48	20	12	15	10

6. Example 9.5, 9.15, 9.17 and 9.20

9.2 7. Calculate the cost of living index by aggregate expenditure method.

Commodity	Weights		Price (Rs.)	
	2010		2010	2015
P	80		22	25
Q	30		30	45
R	25		42	50
S	40		25	35
T	50		36	52

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Chapter 10
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- 10.1 1. Determine an initial basic feasible solution of the following transportation problem by North West Corner

	A	B	C	D	Capacity
Chennai	6	8	8	5	30
Madarai	5	11	9	7	40
Trichy	8	9	7	13	50
Demand	35	28	32	25	

- 10.2 2. Three jobs A, B and C are to be assigned to three machines U, V and W. The processing cost for each job machine combination is shown in the matrix given below. Determine the allocation that minimizes the overall processing cost.

		Machine		
		U	V	W
Job A	A	17	25	31
Job B	B	10	25	16
Job C	C	12	14	11

(Cost in ₹ per unit)

3. Example 10.2, 10.4, 10.9, and 10.12

- 10.3 4. Following pay-off matrix, which is the optimal decision under each of the following rule (i) maximin (ii) minimax.

		states of nature.			
Act		$S_1$	$S_2$	$S_3$	$S_4$
$A_1$	$A_1$	14	9	10	5
$A_2$	$A_2$	11	10	8	7
$A_3$	$A_3$	9	10	10	11
$A_4$	$A_4$	8	10	11	13

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