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GANDHI INSTITUTE OF ENGINEERING AND TECHNOLOGY UNIVERSITY, ODISHA, GUNUPUR

(GIET UNIVERSITY)

B.B.A. (First Semester) Regular Examinations, January – 2025

23BBAPC11003 – Business Mathematics

(BBA)

Time: 3 hrs | Maximum: 60 Marks

(The figures in the right hand margin indicate marks.)

PART – A **(2 x 5 = 10 Marks)**

Q.1. Answer ***ALL*** questions

		CO #	Blooms Level
a.	How many numbers between 5000 and 6000 can be formed with the digits 3, 4, 5, 6, 7, 8?	CO1	K1
b.	Find the values of a, b, c and d in the following matrices. $\begin{bmatrix} a-b & 2a+c \\ 2a-b & 3c+d \end{bmatrix} = \begin{bmatrix} -1 & 5 \\ 0 & 13 \end{bmatrix}$	CO2	K2
c.	Find the slope of $f(x) = x^3 - ½ x^2 + x + 1$ at x = -1.	CO3	K1
d.	Find the income elasticity of demand for a consumer if his income rises from ₹100 to ₹200 and the quantity of a good purchased by him rises from 25 units to 30 units.	CO4	K2
e.	A certain sum of money doubles itself in 10 years. In how many years will it become 2 ½ times at the same rate of simple interest.	CO5	K2

PART – B **(10 x 5 = 50 Marks)**

Answer ***ALL*** the questions

			Marks	CO #	Blooms Level
2. a.	Define Equation. Explain in detail above various types of equations with examples.		10	CO1	K2
	(OR)				
b.	(i)	Solve the following simultaneous equations by the method of substitution: 2x + 3y - 4z = 1, 3x - y - 2z = 4 and 4x - 7y - 6z = 7	10	CO1	K2
	(ii)	Find the number of permutations of the word PERMUTATION.			
	(iii)	How many different words can be made out with the letters in the word ALLAHABAD?			
3.a.	(i)	Find out the values of x, y, and z using Cramer's rule. Explain through step-by-step procedure. x + 2y + 3z = 6, 2x + 3y + 4z = 8, and 3x + 5y + 7z = 10	10	CO2	K2
	(ii)	If $A = \begin{bmatrix} 2 & 3 \\ 4 & 1 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 0 & -1 \\ 2 & 1 & 3 \end{bmatrix}$, then verify $(AB)^T = B^T A^T$			
	(OR)				
b.	Find out the inverse of matrix for the following and prove that $AA^{-1} = 0$. Explain through step-by-step procedure. $\begin{bmatrix} 1 & 3 & 5 \\ 2 & 4 & 6 \\ 5 & 7 & 11 \end{bmatrix}$		10	CO2	K2
4.a.	(i)	Solve the following function using product rule	10	CO3	K3

$$f(y) = \frac{(x+1)(2x^2-1)}{x^2+1}$$

(ii) Find the third derivative for the following function

$$f(y) = (x^5 + 2x^3 - 5x^2)^2$$

(OR)

b. (i) Explain the step-by-step procedure for determination of local maximum and local minimum values, for the following function, $3x^4 - 2x^3 - 6x^2 + 6x + 1$. 10 CO3 K3

(ii) Evaluate the following in step-by-step procedure:

$$\int \frac{2x+9}{x^2+9x+10}\,dx$$

5.a. (i) A company finds the demand q, in thousands for their kites to be $q = 400 - p^2$ at a price of ₹p. find the elasticity of demand when the price is ₹5 and when the price is ₹15. Find the price that will maximize revenue. 10 CO4 K2

(ii) A production facility is capable of producing 60,000 widgets in a day and the total daily cost of producing x widgets in a day is given by

$$C(x) = 2{,}50{,}000 + 0.08x + \frac{20{,}00{,}00{,}000}{x}$$

How many widgets per day should they produce in order to minimize production costs?

(OR)

b. (i) For a particular process, the cost function is given by $C = 56 - 8x + x^2$, where C is cost per unit and x, the number of unit's produced. Find the minimum value of the cost and the corresponding number of units to be produced. 10 CO4 K3

(ii) The total cost function of a firm is $C(x) = x^3/3 - 5x^2 + 28x + 10$ where x is the output. A tax at the rate of ₹2 per unit of output is imposed and the producer adds it to his cost. If the market demand function is given by $p = 2530 - 5x$, where p is the price per unit of output, find the profit maximizing the output and price.

6.a. (i) A company which has raised funds in the form of 1,000 zero coupon bonds worth ₹1,000 each. The company fund for repayment of the bonds which will be after 10 years. Determine the amount of periodic contribution of the annualised rate of interest at 5% and the contribution will be done half-yearly. 10 CO5 K3

(ii) A watch was sold at a profit of 12%. Had it been sold for 33 more, the profit would have been 14%. Find the cost price of the watch.

(OR)

b. (i) Out of ₹70,000 to invest for one year, a man invests ₹30,000 at 4% and ₹20,000 at 3% per annum simple interest. At what rate percent, should he lend the remaining money, so that he gets 5% interest on the total amount he has? 10 CO5 K3

(ii) A man deposited ₹1,000 in a bank. In return he got ₹1,331. Bank gave interest 10% per annum. How long did he kept the money in the bank?

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