QP Code: RJ23BBA005 | Reg. No | | | | | | | | | | | AY 23

# GIET UNIVERSITY, GUNUPUR – 765022

B. B. A (First Semester) Regular Examinations, January – 2024

## 23BBAPC11003 – Business Mathematics

Time: 3 hrs | Maximum: 60 Marks

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

**PART – A** **(2 x 10 = 20 Marks)**

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

| | | CO # | Blooms Level |
|---|---|---|---|
| a. | Solve the following $243^{1/5}$ | CO1 | K3 |
| b. | Solve the following equation 3y + 2[y-{7-3(y-2)}] = 3y - 10. | CO1 | K3 |
| c. | In a box, there are 5 black pens, 3 white pens, and 4 red pens. In how many ways can 2 black pens, 2 white pens and 2 red pens can be chosen? | CO1 | K4 |
| d. | Find the values of x, y and z in the following matrices. $$\begin{bmatrix} x+y & 2 \\ 5+z & xy \end{bmatrix} = \begin{bmatrix} 6 & 2 \\ 5 & 2 \end{bmatrix}$$ | CO2 | K4 |
| e. | Solve the following function $f(x) = 4(x+1)^2(x-3)$ | CO3 | K3 |
| f. | Find the integral of the following $$\int (x+2)(x^3+5x^2-3x-2)\,dx$$ | CO3 | K4 |
| g. | For a particulate product, price was reduced from ₹50 per unit to ₹48 in order to attract more customers. It was observed that demand for the product subsequently increased from 100 to 110 units. Calculate the price elasticity of demand | CO4 | K3 |
| h. | A sum amounts to ₹4,875 at 12½ % simple interest per annum after 4 years. Find the sum. | CO5 | K4 |
| i. | A certain sum of money at simple interest amounts to ₹1,300 in 4 years and to ₹1,525 in 7 years. Find the sum and rate percent. | CO5 | K4 |
| j. | Calculate the compound interest on ₹20,000 for 9 months at the rate of 4% per annum, when the interest is compounded quarterly. | CO5 | K3 |

**PART – B** **(8 x 5 = 40 Marks)**

Answer ***ALL*** the questions

| | | Marks | CO # | Blooms Level |
|---|---|---|---|---|
| 2. a. | Define Index. Explain in detail about various rules of indices. | 8 | CO1 | K2 |
| | (OR) | | | |
| b. | (i) Show the expression $\frac{2^{(m+2)}3^{(2m-n)}5^{(m+n+2)}6^{(n)}}{6^{(m)}10^{(n+2)}15^{(m)}}$ is independent | 8 | CO1 | K5 |

(ii) Solve the following equation:

$$\frac{x}{x-2}+\frac{x-9}{x-7}=\frac{x+1}{x-1}+\frac{x-8}{x-6}$$

3.a. Explain any eight types of matrices with examples. 8 CO2 K2

(OR)

b. Find $A^3 - 6A^2 + 7A + 2I = 0$ 8 CO2 K5

$$\begin{bmatrix}1 & 0 & 2\\ 0 & 2 & 1\\ 2 & 0 & 3\end{bmatrix}$$

4.a. Define Differentiation. Explain the rules of differentiation with examples. 8 CO3 K2

(OR)

b. (i) Explain the step-by-step procedure for determination of local maximum and local minimum values, for the following function $x^2 - 6x^2 + 9x + 15$. 8 CO3 K5

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

$$\int \frac{1}{x+\sqrt{x}}\,dx$$

5.a. (i) A Company sells q ribbon winders per year at ₹p per ribbon winder. The demand function for ribbon winders is given by p = 300 - 0.02q. Find the elasticity of demand, when the price is ₹70 per piece. Will an increase in price lead to an increase in revenue? 8 CO4 K4

(ii) The cost function for the manufacture of x number of goods by a company is $C(x) = x^3 - 9x^2 + 24x$. find the level of output at which the marginal cost is minimum. Further, if the selling price of a unit is $2x^3 + 9x^2$. Find the average profit.

(OR)

b. The weekly cost to produce x widgets is given by 8 CO4 K5

$$C(x) = 75{,}000 + 100x - 0.03x^2 + 0.000004x^3$$

and the demand function for the widgets is given by

$$P(x) = 200 - 0.005x$$

Where $0 \leq x \leq 10{,}000$

Determine the marginal cost, marginal revenue and marginal profit when 2,500 widgets are sold and when 7,500 widgets are sold. Assume that the company sells exactly what they produce. And also find out if they sold 2,501st and 7,501st widget.

6.a. (i) A company's monthly periodic contribution is ₹1,500. The fund will be required to retain a newly taken debt raised for the ongoing project. Do the calculation of the amount of the sinking fund, if the annualised rate of interest is 6% and the debt will be repaid in 5 years. 8 CO5 K4

(ii) What is the present value of ₹2,500 payable 4 years from now at 10% compounded quarterly?

(OR)

b. (i) Mr. Bond has placed ₹65,000 in a savings account with 8% simple interest. How long it be in months until the investment amount to ₹68,900. 8 CO5 K5

(ii) A man sold two horses for ₹29,700 each. On one he lost 10% while he gained 10% on the other. Find his total gain or loss percent in the transaction.

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