

Jamia Hamdard
School of Management and Business Studies
Department of Management
Even Semester Examination - August 2023
B.Com (Hons)-II Semester
Subject Code – BCH203 & Subject Name – Business Mathematics

Roll No...

Duration: 3 Hour

Max. Marks = 60

Section A - Short Answer

(6Q X 4M = 24M)

Note: Attempt any Six Questions, All questions carry equal marks

Q1: What is the future value of Rs 5000 @ 5% p.a. compounded annually after 5 years?

Q2: What is the present value of Rs 5000 receivable 4 years from now @ 1.5% p.m. compounded annually?

Q3: What sum of money should be saved annually at the end of every year for 10 years to accumulate Rs. 100,000 if the rate of interest is 8% p.a. compounded annually?

Q4: Find AB, when $A = \begin{bmatrix} 5 & 4 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}$

Q5: Find $A + B$ & $A - B$, if $A = \begin{bmatrix} 34 & 45 \\ 11 & 2 \end{bmatrix}$ & $B = \begin{bmatrix} -11 & -45 \\ -2 & -34 \end{bmatrix}$

Q6: At what rate of interest per annum will a sum of money double itself in 7 years if the interest is compounded semi-annually?

Q7: Find the Marginal Propensity to Consume at $Y = 5000$, if the consumption function is given as $C = 5000 + 0.22Y^2$, where C = consumption & Y = Income

Q8: Solve: $\int x \log x \, dx$

Q9: Find $\frac{dy}{dx}$ when $y = 3x^3 + \log x + 500x - 250$

Section B-Long Answer

(3Q x 12M = 36M)

Note: Attempt any Three Questions; All questions carry equal marks

Q1: Solve the following LPP graphically

$$\text{Maximize } Z = 3x_1 + 2x_2$$

Subject to constraints:

$$x_1 + x_2 \leq 4$$

$$2x_1 + x_2 \leq 5$$

$$x_1, x_2 \geq 0$$

Q2: Solve the following LPP using the Simplex Method

$$\text{Maximize } Z = 40x_1 + 30x_2$$

Subject to constraints:

$$x_1 + x_2 \leq 12$$

$$2x_1 + x_2 \leq 16$$

$$x_1, x_2 \geq 0$$

Q3: Find the output level, 'x' that minimizes the marginal cost function if the total cost function

$$TC \text{ is given by } TC = \frac{x^3}{3} - 75x^2 + 5000x$$

Q4: The Marginal Revenue Function for a product of a firm is $MR = 50$.

- Find the Total Revenue function of the firm if it is known that the Total Revenue is 0 when no units are sold. [4]
- Find the Average Revenue function [4]
- What should be the average revenue function to maintain the same marginal profit per unit if the cost of production goes up by Rs. 10 per unit? [4]

Q5: Mr. A sells 3 products, P, Q, and R with a per unit profit of Rs. x, Rs. y, and Rs. z. The total daily profit of Mr. A is calculated as the sum of profits earned by the daily sale of the units of all the 3 products P, Q & R. The total daily profit of Mr. A is Rs. 4200 if he sells 20, 40, and 60 units of products P, Q, & R respectively. The total daily profit is Rs. 2750, if Mr. A sells 10, 25 & 45 units of products P, Q, & R respectively. If Mr. A sells 25, 15 & 30 units respectively of products P, Q, & R, then his total daily profit is Rs. 3700. Find the values of x, y, & z based on the above information using the GAUSSIAN ELIMINATION METHOD OR CRAMER'S RULE.

Q6: Solve the following system of equations by matrix inversion.

$$x + 2y + 3z = 14$$

$$-x + 3y + z = 8$$

$$2x + 2y + 2z = 12$$