



Institute of Management
JK Lakshmipat University
Jaipur

END TERM EXAMINATION



BBA Sem- 2
MM: 50 Marks

Course: Business Mathematics
Time: 3 Hours
Subject code: BBA 203

Instructions: Attempt any three questions from Section A. Section B is compulsory.
Use of non-programmable scientific calculator is permitted.

Section A

Q1. Studying the market of a particular good, a researcher has found that the demand function of the good is given by $P = 60 - 3Q^2$, where P is price and Q represents the quantity.

(a) Calculate the price elasticity of demand at $P = \text{Rs. } 40$ per unit.

(b) Calculate the percentage change in demand in response to a 1.5% decrease in price.

(10 marks)

Q2. Describe some of the applications of differential calculus in solving business problems.

(10 marks)

Q3. (a) Show that the elasticity of demand is not constant along a linear demand curve.

(05 marks)

(b) Find $\frac{d^3}{dx^3} (10e^x - 3x^3 + 9x^2 - 24x + 5x^{-2} + 2)$.

(05 marks)

Q4. Find the inverse of the matrix:

$$A = \begin{pmatrix} 2 & -1 & -4 \\ -3 & 0 & 1 \\ -1 & 1 & 2 \end{pmatrix}$$

and verify your result.

(10 marks)

P.T.O.

Q5. The average cost function of a firm is given by $AC = 3Q^2 - 3Q + \frac{100}{Q} + 6$, where AC is the average cost and Q represents the quantity produced.

- (a) Find the total cost (TC) function, the variable cost (VC) function, the fixed cost (FC) function, and the marginal cost (MC) function. (05 marks)
- (b) Find the value of Q for which marginal cost is minimized. (05 marks)

Section B

Q6. As a consultant, you have been retained by a firm to give recommendations regarding the business prospects of producing and selling a particular good. Based on the research conducted by your team, you have been able to conclude that the demand and total cost of the good are given by the following functions:

Demand function: $P = 50 - 2Q$

Total cost function: $TC = 160 + 2Q$

where P is the price of the good, Q represents the quantity of the good and TC stands for total cost.

- (a) Find the maximum value of total revenue. (05 marks)
- (b) Find the break-even points. (05 marks)
- (c) Find the maximum value of profit. (05 marks)
- (d) Sketch the total revenue and total cost functions. Show clearly the break-even points and the levels of output at which total revenue and total profit are maximized. (05 marks)