2021

Time : 3 hours

Full Marks : 70

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Answer from both the Parts as directed.

Part – A

(Short-answer Type Questions)

1. Answer **all** questions of the following :

$2 \times 7 = 14$

(a) Define function.

(b) Define Derivative.

(c) Write down the condition of Maxima and Minima.

(d) Write the conditions of Profit Maximisation of a Firm.

(e) Explain the meaning of Linear Programming.

(f) Explain the Meaning of Input-Output Analysis.

(g) Define Matrix.

Part – B

(Long-answer Type Questions)

Answer any **four** questions of the following :

$14 \times 4 = 56$

2. Explain the type functions and also, functions in economics.

3. Given Demand Function i.e D = 35 – 3P and Supply Function i. e. S = 2P. Find Equilibrium Price and Equilibrium Quantity before and after the imposition of a tax of Rs.2/- per unit of output.

4. Find Derivative $\left(\frac{dy}{dx}\right)$ from the following function :

(a) $Y = \frac{1}{\sqrt{x}}$

(b) $Y = \sqrt{a + bx}$

(c) $Y = \frac{F(x)}{x}$

(d) $x^2y = 10$

(e) $Y = \log\sqrt{1 - x^2}$

5. Given $Y = x + \frac{1}{x}$

find maximum and minimum value of the function.

6 Given Total Cost Function i.e.

$$C = 2Q - 2Q^2 + Q^3$$

(a) Find TVC, TFC, AVC and AFC

(b) Find MC and AC function and also, show that at the Minimum of Average Cost, Average Cost is equal to Marginal Cost.

7. Given Total Cost Function i.e $TC = \frac{1}{25}x^2 + 3x + 100$ and Demand Function i. e $x = 75 - 3P$. Find profit maximising output and equalibrium price of a firm.

8. Mathematically explain the features of Cobb-Dauglas Production Function.

9. Write short notes on any **two** of the following :

(a) Relation between Average Cost and Marginal Cost

(b) Input-output Open Model

(c) Elasticity of Demand

(d) Method of Econometic Research

(e) Relationship among Total Revenue, Marginal Revenue, Average Revenue and Elasticity of Demand

(f) Type of Matrix

10. Solve the linear programming problem by Graphic Method of the following :

$$\text{Max } Z = 2x + 5y$$

Subject to $x + 4y \le 24$ — $x + 4y = 24$

$3x + y \le 21$ — $3x + y = 21$

$x + y \le 9$ — $x + y = 9$

Non-Negative constraints x and $y \ge 0$.