

Exam. Code : 103203

Subject Code : 1122

B.A./B.Sc. 3rd Semester

QUANTITATIVE TECHNIQUES—III

Time Allowed—Three Hours] [Maximum Marks—100

Note :—Answer **FIVE** questions choosing at least **ONE** question from each section. The **fifth** question may be attempted from any section.

SECTION—A

1. The cost function of a firm $C = 5000 + 25,000Q - 180Q^2 + 0.50Q^3$. What then will be the Marginal Cost Curve ? What will be the Average Cost Curve ? What is the point at which Average Cost is minimised ? What is the point at which Average Variable Cost is minimised ? 20
2. Consider $V = 4x^3 - 120x^2 + 864x$. Does this have a maximum ? Does it have a minimum ? Depending on your answer, maximise or minimise it. 20

SECTION—B

3. The demand curve of a good is given by $Q^D = 15 - P$. The supply curve is given by $Q^S = 2P$. What will be the consumer surplus ? 20
4. Integrate :

$$(a) \int [(6x+13)/(x^2+5x+6x)] dx$$

$$(b) \int_1^2 (x^2 + x^{-2}) dx. \quad 10 \times 2 = 20$$

SECTION—C

5. Consider the following IS-LM Model where the consumption function is given by $C = 10 + 0.5 Y$, and investment function $I = 190 - 20i$. The total money supply $M^S = 100$ while the Money Demand $M^d = 0.4Y - 80i$. Calculate the equilibrium values of Y, I, C and i . 20
6. Find the inverse of the matrix :

$$\begin{bmatrix} 4 & -5 & -2 \\ 5 & -6 & -2 \\ -8 & 9 & 3 \end{bmatrix}$$

Verify by multiplying the inverse with the original.

20

SECTION—D

7. Consider the following LPP :

$$\text{Maximise } z = 5x_1 + 7x_2$$

$$\text{subject to } x_1 + x_2 \geq 4,$$

$$3x_1 + 8x_2 \geq 20,$$

$$10x_1 + 7x_2 \geq 32.$$

Now frame its dual and solve it. 20

8. Consider the following input-output matrix of 3 by 3 sector model of an economy given below where the entries signify how much the production a unit of each sector demands from all sectors :

Sector	Primary	Services	Manufacturing
Primary	0.04	0.08	0.08
Services	0.1	0.06	0.02
Manufacturing	0.4	0.02	0.2

The required net production of the three sectors are 5 trillion, 3 trillion and 6 trillion rupees respectively. What should be the gross production of the all the three sectors ? 20