Reg. No. | | | | | | | | | |

BASECC 357

Credit Based VI Semester B.A. Degree Examination, September 2022
(Common to all Batches)
ECONOMICS
Mathematical Economics

Time : 3 Hours   Max. Marks : 120

Instructions : *i) An Answer booklet of **40** pages will be given.*
*ಸೂಚನೆಗಳು : **40** ಪುಟಗಳ **ಒಂದು** ಉತ್ತರ ಪುಸ್ತಿಕೆಯನ್ನು ನೀಡಲಾಗುವುದು.*
*ii) **No** additional sheets will be given.*
***ಹೆಚ್ಚುವರಿ** ಹಾಳೆಗಳನ್ನು ನೀಡಲಾಗುವುದಿಲ್ಲ.*

SECTION – A

Answer **any two** of the following. **(20×2=40)**

1. a) What are the conditions necessary for linear demand and supply of a single commodity to represent a normal economic situation ?

   b) For the following pair of demand and supply equations determine the market equilibrium quantity and price algebraically and graphically.

   $X = 10Y + 4Y^2$

   $X = 96 - 8Y - 2Y^2$. **(4+16=20)**

2. a) What is Linear Programming ? Point out its usefulness in Economic Analysis.

   b) Obtain the optimum solution for the following linear programming problem :

   Maximize : $Z = 45x_1 + 55x_2$

   Subject to : $6x_1 + 4x_2 \leq 120$

   $3x_1 + 10x_2 \leq 180$. **(4+16=20)**

3. a) Explain the usefulness of integral calculus in Economic analysis.

   b) If the demand function is $y = 16 - x^2$ and the supply function is $y = 2x + 1$, where y refers to price and x represents quantity. Find consumer's surplus and producers surplus under pure competition. **(4+16=20)**

4. a) Mention some of the uses of differential calculus in Economics.

   b) The average revenue for a particular commodity is $y = 26 - 3x^2$ and the total cost to monopolist is $y_c = 3x^2 + 2x + 14$. Determine the maximum possible profit obtainable by a monopolist. **(4+16=20)**

SECTION – B

Answer **any five** of the following questions. **(10×5=50)**

5. Define mathematical economics. Explain the uses and limitations of mathematical economics.

6. For the following pair of demand functions, determine the four marginal demands and the nature of relationship between the two commodities and four partial elasticity of demand.
   $x = 5 - 2p + q$
   $y = 8 - 2p - 3q$.

7. The demand and supply function for a commodity is given. Find equilibrium price and quantity algebraically and graphically.
   $D = 100 - 2p$
   $S = -20 + p$

8. The demand for a certain commodity found to be $D = 100 - 2p$

   a) What is the demand if the price is Rs. 10 ?

   b) What should be the price if the seller wants to sell 80 units ?

   c) What is the largest quantity one can sell ?

   d) What is the maximum price he can charge for a commodity ?

9. Solve the equation through Cramers rule.
   $3x + 2y = 5$
   $7x + 3y = 10$

10. Identify which of the following equations represents demand curve and which supply curve (x represents quantity and y represents price per unit)

    i) $3x + 4y - 12 = 0$

    ii) $5x - y - 10 = 0$

    iii) $x - 3 = 0$

    iv) $2y + 3x + 2 = 0$.

11. For the following demand function demonstrate the relationship between marginal revenue and elasticity of demand given by

$$MR = Y\left[1 + \frac{1}{\frac{E_x}{E_Y}}\right]$$

$Y = 100 - 6x^2$.

SECTION – C

Answer **any five** of the following. **(6×5=30)**

12. Explain different types of matrices.

13. A company has the following total revenue function
$R = 24x - 3x^2$.
   i) What equation represents the average revenue function ?
   ii) What equation represents the marginal revenue function ?
   iii) At what level of output the revenue of the company maximum ?

14. If the marginal revenue is $MR = 20 - 3x^2$, find the total revenue and demand function.

15. For the following production function, determine the degree of homogeneity and the nature of returns to scale.
$Z = 25y^6 - x^2y^4$.

16. Ten watches are sold when the price is Rs. 80 and 20 watches are sold when the price is Rs. 60. What is the demand equation ?

17. If $A = \begin{bmatrix} 7 & 2 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 2 \\ 6 \\ 1 \end{bmatrix}$ Find AB and BA.

18. Find the inverse of the matrix $A = \begin{bmatrix} 3 & 8 \\ 1 & 4 \end{bmatrix}$.