ECO 602.2   Reg. No. ....

CREDIT BASED SIXTH SEMESTER B.A DEGREE EXAMINATION
APRIL 2012
ECONOMICS
PAPER – VIII: MATHEMATICAL ECONOMICS

Time: 3 Hrs   Max. Marks: 105

PART – I

Answer any TWO of the following: 20X2=40

1. a) What are the conditions necessary for linear demand and supply of a single commodity
        to represent a normal economic situation?   **04**
    b) For the following pair of demand and supply equations determine the market
        equilibrium quantity and price algebraically and graphically.   **16**
        $$x = 10y + 5y^2$$
        $$x = 64 - 8y - 2y^2$$

2. a) Mention some of the uses of differential calculus in economics.   **04**
    b) The Average Revenue function for a particular commodity is $y = 26 - 2x - 4x^2$ and
        the average cost to the Monopolist is $\overline{Y}c = x + 8$. Determine the maximum possible
        profit obtainable by a monopolist.   **16**

3. a) Explain the usefulness of integral calculus in economic analysis.   **04**
    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 producer's
        surplus under pure competition.   **16**

4. a) Explain the meaning and usefulness of Linear Programming.   **04**
    b) Obtain the optimum solution for the following Linear Programming Problem.
        Maxmize $: Z = 45x_1 + 55x_2$
        Subject to $: 6x_1 + 4x_2 \leq 120$ **16**
        $$3x_1 + 10x_2 \leq 180$$

PART – II

Answer any FOUR of the following: 10X4=40

5. Define Mathematical Economics. Explain the uses and limitations of Mathematical
    Economics.

6. Identify which of the following equations represents demand curve and which supply
    curve (X' represents quantity and 'Y' represents price per unit).
    i) $x - 2y = 0$ ii) $3x + 4y = 12$ iii) $x = 4y - 6$ iv) $2y + 3x - 10 = 0$

7. The demand law is $x = 400 - 4p$
    a) What is the highest price anyone would pay for the commodity?
    b) What is the demand when commodity is free?
    c) Find the quantity demanded if the price is Rs.10.
    d) Find the price if the quantity demanded is 100.

8. If the average cost function is $\overline{Y}c = 2x + 5 + \dfrac{18}{x}$
    a) What equation represents the total cost function?
    b) What equation represents the marginal cost function?

- 1 -

c) At what quantity will average cost be minimum?

d) Prove that at that point marginal cost and average cost are equal.

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

$$MR = Y \left[1 + \frac{1}{\dfrac{Ex}{Ey}} \right]$$

$$y = 17 - 6x$$

10. For the following pair of demand functions, determine the four marginal demands and the nature of the relationship between the two commodities and the four partial elasticities of demand:

$$x = 20 - 2p - q$$
$$y = 9 - p - 2q$$

PART – III

III Answer any five of the following: 5X5=25

11. Explain the meaning of variables, constant and a function with examples from economics.

12. A small firm incurs fixed expenses amounting to Rs.5,000/-. Its variable cost of production is Rs.7.50 per unit. Its selling price is s.10 per unit. Determine its break-even quantity.

13. Aggregate national consumption is given by $C = 10 + 0.55Yd$ where Yd is disposable income (in billions of rupees).

a) What is aggregate consumption when disposable income is 10 billion rupees?

b) When disposable income is 5 billion rupees, what proportion of it is consumed?

14. Pareto's Law of Income distribution for a particular group is given by: $N = \dfrac{216x10^{10}}{X^{\frac{3}{2}}}$

i) How many people are millionaires?

ii) How many people have income between Rs.3,600 and Rs.10,000?

15. A company has the following total revenue function: $R = 36x - 2x^2$

a) What equation represents the average revenue function?

b) What equation represents the marginal revenue function?

c) At what level of output the revenue of the company is maximum?

16. Find the first derivative with respect to x for the following functions:

i) $Y = 4x^2 + 2x$

ii) $Y = 2x^3 + 4x^2 - 5x + 8$

17. For the following production function, determine the degree of homogeneity and the nature of the returns to scale. $Z = 3x^3 + 5xy^2 + y^3$.

18. Find the inverse of the matrix;

$$A = \begin{bmatrix} -1 & 6 \\ 4 & 3 \end{bmatrix}$$

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ECO 602.2   Reg. No. ....

CREDIT BASED SIXTH SEMESTER B.A EXAMINATION - APRIL 2013
ECONOMICS
MATHEMATICAL ECONOMICS – PAPER - VIII
Time: 3 Hrs   Max. Marks: 120
PART – I
Answer any TWO of the following: 24X2=48

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

$$x = 10y + 5y^2$$
$$x = 64 - 8y - 2y^2$$ (6+18)

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

    b) The Average Revenue function for a particular commodity is $\bar{Y} = 26 - 2x - 4x^2$ and the Average Cost to the Monopolist is $\bar{Y}_c = x - 8$

    Determine the Maximum possible profit obtainable by a monopolist.   (6+18)

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 producer's surplus under pure competition.   (6+18)

4. Solve the following simultaneous equations using Cramer's rule.   (24)

$$x + y + z = 3$$
$$2x - y - z = 0$$
$$3x - 4y + z = 8$$

PART – II
Answer any FOUR of the following: 12X4=48

5. Define a function. Distinguish between linear and non-linear functions. Explain their usefulness.

6. Identify which of the following equations represents demand curve and which supply curve (X represents quantity and Y represents price per unit)

    i)   2x – 4 = 0

    ii) x - 2y = 0

    iii) 3x + 4y = 10

    iv) y – 4 = 0

- 1 -

7. The demand law is X = 200 – 2p
   a) What is the highest price anyone would pay for the commodity?
   b) What is the demand when commodity is free?
   c) Find the quantity demanded if the price is Rs. 10
   d) Find the price if the quantity demanded is 150
   e) Graph the demand curve

8. For the following total cost function, $Y = 1000x - 180x^2 + 3x^3$

   a) Find the marginal cost and determine the nature of marginal cost whether increasing or decreasing?

   b) Find the average cost (AC) function and the point at which AC is minimum.

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

$$MR = Y\left(1 + \frac{1}{\frac{Ex}{Ey}}\right)$$

$$Y = 100 - 6x^2$$

10. For the following pair of demand functions, determine the four marginal demands and the nature of the relationship between the two commodities and the four partial elasticities and demand

$$x = 15 - 2p + q$$

$$y = 16 + p - q$$

PART – III

Answer any FOUR of the following: 6X4=24

11. Explain the different types of matrices.

12. When the price of a camera is Rs. 500, 100 cameras are supplied to the market by a firm. When the price goes up to Rs. 1000 per Camera, 400 cameras are supplied. What is the Supply function?

13. Suppose the fixed cost of production for a commodity is Rs. 5000; the variable cost is Rs. 7.50 per unit and the commodity sells for Rs. 10 per unit. What is the break-even quantity?

14. A Company produces amounts of X and Y of two different kinds of candy using the same production process. The Production Transformation Curve for the input used is given by:

   (x – 24) (y – 36) = 240   (x< 24)

   i) What are the largest amounts of X and Y that can be produced?

   ii) Sketch the Product Transformation Curce.

15. For the following production function, determine the degree of homogeneity and the nature of the returns to scale.

$$Z = 3x^4 + 2x^2y^2 + 7y^4$$

16. Find the inverse the matrix $A = \begin{bmatrix} -2 & 4 \\ 2 & 6 \end{bmatrix}$

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CREDIT BASED SIXTH SEMESTER B.A. DEGREE EXAMINATION
APRIL 2014
ECONOMICS - VIII
Mathematical Economics

Time: 3 Hrs   Max. Marks: 120

PART - I

Answer any TWO of the following: 24X2=48

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.   (6+18=24)
    $$x = 10y + 5y^2$$
    $$x = 64 - 8y - 2y^2$$

2. a) Mention some of the uses of differential calculus in Economics.
    b) The Average Revenue function for a particular commodity is $Y = 28 - 5x$ and the Average Cost to the Monopolist is $\bar{Y_c} = x = 4$.
    Determine the maximum possible profit obtainable by a monopolist. (6+18=24)

3. a) Explain the usefulness of integral calculus in Economic analysis.
    b) If the Demand function is $Y = 20 - 3x^2$ and the Supply function is $Y = 2x^2$, Where y refers to price and x represents quantity. Find consumer's surplus and producer's surplus under pure competition.   (6+18=24)

4. a) What is Linear Programming? Point out its usefulness in Economic Analysis.
    b) Obtain the optimum solution for the following linear programming problem.
    Maximize $Z = 50x_1 + 60x_2$
    Subject to $5x_1 + 8x_2 \leq 200$
    $10x_1 + 8x_2 \leq 240$ (6+18=24)

PART - II
Answer any FOUR of the following: 12X4=48

5. Define Mathematical Economics. Explain the uses and limitations of Mathematical Economics.

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

    a) x-2y=0   b) 3x+4y-10=0   c) 3y-x=9   d) 2y+3x=10

7. The demand and supply curves of a commodity are given as

    $$D = 55 - P$$
    $$S = -5 + 4P$$

    Find the market equilibrium price and quantity algebraically and graphically.

8. If the average cost function is $\bar{Y}_C = 2x + 5 + \frac{18}{x}$

   a) What equation represents the total cost function?

   b) What equation represents the marginal cost function?

   c) Prove that at that point marginal cost and average cost are equal.

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

$$MR = Y \left[1 + \frac{1}{\frac{Ex}{Ey}} \right]$$

$$Y = 550 - 3x - 6x^2$$

10. For the following pair of demand functions, determine the four marginal demands and the nature of the relationship between the two commodities and the four partial elasticity of demand.

$$x = 15 - 2p + q$$
$$y = 16 + p - q$$

PART - III

Answer any FOUR of the following: 6X4=24

11. Explain the meaning of variables, constant and a function with examples from Economics.

12. A small firm incurs fixed expenses amounting to ₹12,000. Its variable cost of production is ₹5 per unit. Its selling price is ₹8 per unit. Determine its break-even quantity.

13. A company has the following total revenue function.

$$R = 36x - 2x^2$$

   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. For the following production function, determine the degree of homogeneity and the nature of the returns to scale.

$$Z = 3x^3 + 5xy^2 + y^3$$

15. Show that for the demand function

$$x = \frac{25}{y^4}$$

   The elasticity of demand is constant at $y = 2$ and $x = \frac{25}{16}$

16. Find the inverse of the matrix $A = \begin{bmatrix} 3 & 1 \\ 2 & 4 \end{bmatrix}$

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CREDIT BASED SIXTH SEMESTER B.A. DEGREE EXAMINATION
APRIL 2015
ECONOMICS
Paper VIII – Mathematical Economics

Time: 3 Hrs   Max. Marks: 120

PART - I

Answer any TWO of the following: 24×2=48

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.   (6+18=24)

    $$y = 48 - 3x^2$$
    $$y = x^2 + 4x + 16$$

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

    b) The Average Revenue function for a particular commodity is $\overline{Y} = 26 - 2x - 4x^2$ and the Average Cost to the Monopolist is $\overline{Y}_c = x + 8$.
        Determine the maximum possible profit obtainable by a monopolist.   (6+18=24)

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 producer's surplus under pure competition.   (6+18=24)

4. 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 $6x_1 + 4x_2 \leq 120$
    $$3x_1 + 10x_2 \leq 180$$ (6+18=24)

PART - II

Answer any FOUR of the following: 12×4=48

5. Define Mathematical Economics. Explain the uses and limitations of Mathematical Economics.

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

    a) $3y - x = 9$ b) $3x + 4y - 12 = 0$ c) $x - 3y = 90$ d) $2y + 3x = 10$

7. The demand law is $X = 400 - 4p$

    a) What is the highest price anyone would pay for the commodity?

    b) What is the demand when commodity is free?

    c) Find the quantity demanded if the price is ₹10.

    d) Find the price if the quantity demanded is 300.

8. If the average cost function is $\overline{Y}_c = 25 - 8x + x^2$

   a) What equation represents the total cost function?

   b) What equation represents the marginal cost function?

   c) At what quantity will average cost be minimum?

   d) Prove that at that point marginal cost and average cost are equal.

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

$$MR = Y\left[1 + \frac{1}{\frac{Ex}{Ey}}\right]$$

$$Y = 17 - 6$$

10. Find the profit maximizing output and the total profit at that point if the Marginal Revenue and Marginal Cost functions are given as

$$MR = 15 - 5x$$
$$MC = 10 - 3x + 3x^2$$

PART – III

Answer any FOUR of the following: 6×4=24

11. Explain the meaning of variables, constant and a function with examples from Economics.

12. Suppose that the consumption function is given by

$$C = 10 + 0.55Yd$$

Where C is aggregate consumption and Yd is disposable income (in billions of Rupees).

   a) What is aggregate consumption when disposable income is 10 billion Rupees?

   b) When disposable income is 5 billion rupees, what proportion of it is consumed?

   c) When disposable income is 5 billion rupees, what proportion of aggregate consumption is consumption of disposable income?

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. For the following production function, determine the degree of homogeneity and the nature of the returns to scale.

$$Z = 25y^6 - x^2y^4$$

15. Marginal Cost as a function of units produced is given by $MC = 2 + 60x - 5x^2$.

   Find the total and average cost functions if fixed cost is 45.

16. Find the inverse of the matrix $A = \begin{bmatrix} -1 & 6 \\ 4 & 3 \end{bmatrix}$

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ECO 602.4   Reg. No. ....

CREDIT BASED SIXTH SEMESTER B.A. DEGREE EXAMINATION - APRIL 2016
ECONOMICS
Paper VIII – Mathematical Economics

Time: 3 Hrs   Max. Marks: 120

PART - I

I. Answer any TWO of the following: 24×2=48

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.

$$x = 10y + 5y^2$$

$$x = 64 - 8y - 2y^2$$ (6+18=24)

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

    b) The Average Revenue function for a particular commodity is $y = 26 - 3x^2$ and the total cost to the monopolist is $Y_C = 3x^2 + 2x + 14$.

    Determine the maximum profit obtainable by a monopolist.

                                                              (6+18=24)

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 producer's surplus under pure competition.   (6+18=24)

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

    b) Obtain the optimum solution for the following linear programming problem.
    Maximize $Z = 50x_1 + 60x_2$

    Subject to $5x_1 + 8x_2 \leq 200$
    $10x_1 + 8x_2 \leq 240$ (6+18=24)

PART - II

II. Answer any FOUR of the following: 12×4=48

5. Define Mathematical Economics.   Explain the uses and limitations of Mathematical Economics.

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

    a) $3x + 4y - 12 = 0$ b) $5x - y - 10 = 0$ c) $y - 4 = 0$ d) $2x + 4y = 4$

7. The demand law is $X = 400 - 4p$

    a) What is the highest price anyone would pay for the commodity?

    b) What is the demand when commodity is free?

    c) Find the quantity demanded if the price is ₹10.

    d) Find the price if the quantity demanded is 300.

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

$$MR = Y \left[1 + \frac{1}{\frac{Ex}{Ey}} \right]$$

$$Y = 17 - 6x$$

9. If the average cost function is $\overline{Y}_c = 25 - 8x + x^2$

a) What equation represents the total cost function?

b) What equation represents the marginal cost function?

c) At what quantity will average cost be minimum?

d) Prove that at that point marginal cost and average cost are equal.

10. For the following pair of demand functions, determine the four marginal demands and the nature of the relationship between the two commodities and the four partial elasticities of demand

$$x = 5 - 2p + q$$
$$y = 8 - 2p - 3q$$

PART – III

III. Answer any FOUR of the following: 6×4=24

11. Explain the meaning of variables, constant and a function with examples from Economics.

12. Suppose the fixed cost of production for a commodity is Rs. 5,000; the variable cost is Rs. 7.50 per unit and the commodity sells for Rs. 10 per unit. What is the break-even quantity?

13. A company has the following total revenue function.

$$R = 36x - 2x^2$$

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 demand function is given as $x = \dfrac{5}{y^3}$

Calculate the elasticity of demand at $y = 1$ and $x = 5$.

15. For the following production function, determine the degree of homogeneity and the nature of the returns to scale.

$$Z = 3x^3 + 5xy^2 + y^3$$

16. Find the inverse matrix $A = \begin{bmatrix} -1 & 6 \\ 4 & 3 \end{bmatrix}$

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