24-12-2015

Time Allowed: 3 Hrs.   **Maximum Marks: 50**
Note: Attempt All Questions from Sections A,B,C.

SECTION : A   **(Marks: 5x2=10)**
All questions are compulsory and carry equal marks.

1. What will be the optimum solution of a linear programming problem if the graph of the objective function coincides with one of the constraints? Explain with suitable diagram.

2. Given Total Revenue (R) is equal to the product of price (AR) and quantity q and p is a function of q, show that
   $MR = AR [1+ 1/e_d]$, where e_d is the elasticity of demand

3. If the demand and output are given by $p= a+ bq$ and $q= cL+dL$ where p is price, q is quantity and L is labour. Show that the MRP (Marginal Revenue Product) is given by
   $dR/dL = ac + 2(ad +bc^2)L + 6bcdL^2 + 4bd^2L^3$

4. Given the time path of price $P_t = (P_o -P_q)e^{-bt} + P_q$, where P_o is the initial price, and P_q is quilibrium price, b>0. Show that P_t is dynamically stable as t tends to infinity. Also represent it diagrammatically.

5. Differentiate between differential equation and difference equation.

SECTION : B
Answer any FOUR.   **(Marks: 4x5=20)**

1. Given $Y = C + I + G$
                  $C = a + b (Y - T)$ $a,b > 0$
                  $T = t Y$ $t > 0$
   where Y is national income, C is consumption, T is tax and a,b,t are parameters. Obtain the equilibrium values of the endogenous variables using matrix algebra.

2. The demand functions of a monopoly in two different markets are given by
   $$P_1 = 53 - 4Q_1$$
   $$P_2 = 29 - 3Q_2$$
   and the total cost function is $C = 20 + 5Q$ where P_1 and P_2 are the prices and Q_1 and Q_2 are the outputs in market 1 and market 2 respectively such that $Q= Q_1+Q_2$
   Find
   i)   profit maximising output to be sold in first and second markets
   ii)   equilibrium prices of first and second markets

3. Solve the following difference equation

$$y_{t+1} + 3y_t = 2 \text{ and } y_0 = 5$$

4. Given a demand function of Engel's Curve type $D = A\, P^\alpha\, N^{(1-\alpha)}$ where D is demand, P is price, N is income, A and α are parameters. Find the partial effect of price and income on demand and state the economic interpretation of A and α.

5. Given the short-run total cost function

$$C = 2Q^3 - 15Q^2 + 30Q + 16$$

a) Find out the level of output at which average variable cost (AVC) is minimum and also show that MC = AVC at that level of output.

b) Show that when output Q = 4, the average cost is minimum and MC = AC.

SECTION : C
Attempt any TWO questions.   *(Marks: 2x10=20)*

1. Using the concept of differential equation, obtain the Harrod- Domar Growth Model for the following cases
   a) When the autonomous investment is fixed
   b) When autonomous investment is progressive

2. Minimise

   $$C = 12x_1 + 42 x_2$$

   subject to
   $$x_1 + 2x_2 \geq 3$$
   $$x_1 + 4x_2 \geq 4$$
   $$3x_1 + x_2 \geq 3$$
   $$\text{and } x_1, x_2 \geq 0$$

3. Given a consumption function $C = 1000 - 5000/(3+Y)$, find
   i) marginal propensity to consume when Y= 97
   ii) marginal propensity to save when Y=97
   iii) determine whether MPC and MPS move in the same direction when Y changes.

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