

8-12-17

DOON UNIVERSITY, DEHRADUN
Final Semester Examination, 2017
Department of Economics
MSc (Integrated) Seventh Semester/ M.A. First Semester
SSEI- 513- Mathematics for Economists/ SSE- 511: Mathematical Methods

Time Allowed: 3 Hrs.

Maximum Marks: 50

Note: Attempt All Questions from Sections A,B,C.

SECTION : A

All questions are compulsory and carry equal marks.

(Marks: 5x2=10)

1. $a_{11}, a_{12}, a_{13}, \dots, a_{1n}$ are the input co-efficient across the first row of an input co-efficient matrix and $x_1, x_2, x_3, \dots, x_n$ are the outputs of n industries. Does adding up the input co-efficient across a row carry any economic meaning? What is the total amount of x_1 needed as input for the n industries?
2. Given the demand curve, $x = 20/(p+1)$, find the elasticity of demand when $p=3$
3. The capital stock at time t , $k(t)$ is the integral of the investment at time t , $I(t)$. If $I(t) = 4vt$, find $k(t)$. Also find the capital formation from the first year to the fourth year.
4. In the single commodity linear market model, if the sum of the slope of the demand curve and the slope of the supply curve is equal to zero, what can you conclude regarding the positions of the demand and supply curves? What can you conclude regarding the equilibrium solutions?
5. Given the following demand and supply functions, determine whether the equilibrium price is stable, unstable or regular
 - a) $D=18-3P_t, S = -3+4P_{t-1}$
 - b) $D=19-6P_t, S=6P_{t-1}-5$

SECTION : B

Answer any FOUR.

(Marks: 4x5=20)

1. Show that the demand curve $p = \{a/(x+b)\} - c$ is downward sloping and convex from below. Do the same properties hold for the marginal revenue curve?
2. A firm has the following Total Cost function and Demand function
 $C = 1/3Q^3 - 7Q^2 + 111Q + 50$ and $Q = 100 - P$. Find the profit maximising level of output. Also find the profit at this level of output.
3. Solve the following problem
Maximize
 $y = x_1x_2 + 2x_1$
subject to $x_1 + 2x_2 = 20$
4. Define consumer surplus and producer surplus. Given $Q = 10 - 1/3P$, find the consumer surplus when the consumer purchases 5 units and the market price is `15.
5. Define a homogenous production function. Show that the Cobb-Douglas production function is homogenous of degree $(a+b)$, where a is the output elasticity of labour and b is the output elasticity of capital.