

10/12/16

DOON UNIVERSITY, DEHRADUN
Final Semester Examination, 2016
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. How does a basic feasible solution differ from an optimum solution?
2. Give two importance of differentiation in economics.
3. State whether the following statement is true or false and give reasons for your answer. "The second order condition for profit maximisation states that $R'(Q) < C'(Q)$ where R is the revenue, C is the cost and Q is the output."
4. Is there any economic meaning when we add up the input co-efficients across a row in the input co-efficient matrix of an input output model? Give reasons.
5. 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.

SECTION : B

Answer any FOUR.

(Marks: 4x5=20)

1. The total cost C of a firm is given by
$$C = 1000 + 100q - 80q^2 + 1/3q^3$$
where q is the quantity produced.
 - i) Find the marginal cost of production
 - ii) At what value of q does marginal cost equal average variable cost?
2. Find $\int (5e^{2x} + 10x/5x^2 + 10) dx$
3. Solve the equation $dy/dx + 5y = 10$ with the initial condition $y(0) = 6$
4. Solve the first order difference equation
 $y_{t+1} + 3y_t = 2$ with $y_0 = 5$
5. 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 profit maximising output to be sold in first and second markets and equilibrium prices of first and second markets

SECTION : C

Attempt any TWO

(Marks: 2x10=20)

1. Consider a simple one-commodity market model

$$Q_d = a - bP$$

$$Q_s = -c + dP$$

$$Q_d = Q_s$$

Find the equilibrium price and quantity and determine the effect of change in the value of a, b, c and d on equilibrium price and equilibrium quantity.

2. Euler's theorem states that if the factors of production are paid according to the marginal productivity, the total product will be exhausted. Show that the Cobb Douglas production function satisfies this Euler's Theorem. State the condition required to satisfy this theorem.
3. A producer desires to minimize the cost of production $C = 16k + 4L$ where k and L are capital and labour respectively subject to the given production function $Q = 5k^{1/2}L^{1/2}$. Find out the equilibrium combination of inputs (k and L) in order to minimize the cost of production when output $Q = 40$
