MACHAKOS UNIVERSITY

University Examinations for 2016/2017 Academic Year

SCHOOL OF BUSINESS AND ECONOMICS

DEPARTMENT OF BUSINESS ENTREPRENEURSHIP AND MANAGEMENT SCIENCES

EXAMINATION FOR DIPLOMA IN PROCUREMENT AND SUPPLIES MANAGMENT

QUANTITATIVE TECHNIQUES

DATE:5/12/2016   TIME:

INSTRUCTIONS.

Answer Question One and Any Other Two Questions

QUESTION ONE (30MARKS)

a) The quantity of a commodity demanded is a function of its own price that is $Q = f(P)$, specified by the following equation:

$$Q = 9 - P$$

      i.   Explain the meaning of the expression, $Q = f(P)$ (2Marks)

     ii.   Find the values of $Q(0)$, $Q(4)$ and $Q(6)$ (6marks)

b) The demand and total cost function for a firm are given by:

$$P = 35 - 2Q$$

$$TC = 4Q^3 - \frac{21}{4}Q^2 + 49Q + 35$$

Find:

i. the level of Q and P that will maximize profits
ii. the level of Q that will maximize Total Revenue, TR
iii. the level of Q that will minimize Average Variable Cost, AVC
iv. the level of Q that will minimize Marginal Cost, MC.
v. the minimum AVC and MC   (10marks)

c) Define the following terms as used in the study of function:

    i.   range
    ii.   domain   (4marks)

d) Consider the following demand function for some product given as:

$$P = 16 - 0.4Q$$

    Find:

    i.   Total Revenue function
    ii.   Average Revenue function
    iii. Marginal Revenue function
    iv.   the value Q for which $MR = 0$ (8marks)

QUESTION TWO

Explain the role played by Quantitative Techniques in managerial decision making.
(20marks)

QUESTION THREE

a) The management of XYZ Company Ltd. assumes that there is a direct relationship
between advertising expenditures (X) and the level of sales (Y) made. Monthly
values for advertising expenditure and levels of sales collected for are as shown
below:

X	10	12	8	17	10	15	10	14	19	10
Y	15	17	13	23	16	21	14	20	17	16

i) Determine the regression model of sales level on advertising. (8Marks)

ii) Calculate the coefficient of correlation and coefficient of determination.

iii) Interpret the results in (ii)

QUESTION FOUR

A firm is said to be in equilibrium when producing at a level that corresponds with the lowest average cost, AC. given the total cost function as:

$$TC = 5 + 3Q - 2Q^2 + \frac{1}{2}Q^2$$

i. Determine the equilibrium output Q and the corresponding average cost
ii. sketch the graph of average cost against Q, taking 3 points above and 3 points   (20marks)

QUESTION FIVE

A monopolist faces the following demand and cost functions given by:

$$P = 140 - 2Q$$

$$TC = 10 + 5Q^2$$

Where P = Price per unit of output

Q = Quantity produced and sold

a) Derive the profit function
b) Determine
    i. the level of Q to be produced and sold to maximize profit
    ii. profit-maximizing price
    iii. maximum profit
    iv. the level of Q that maximizes sales revenue
    v. the sales revenue maximizing price.   (20marks)