



THE CATHOLIC UNIVERSITY OF EASTERN AFRICA

A. M. E. C. E. A

MAIN EXAMINATION

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AUGUST - DECEMBER 2016 TRIMESTER

FACULTY OF COMMERCE

DEPARTMENT OF ACCOUNTING AND FINANCE

O DEL PROGRAMME

CMS 121: BUSINESS MATHEMATICS

Date: DECEMBER 2016

Duration: 2 Hours

INSTRUCTIONS: Answer Question ONE and ANY OTHER TWO Questions

- Q1. i) XYZ Company is operating in a perfectly competitive market. It has a demand curve of the form $Q_D = 20 - 2P$ where Q_D is the quantity demand of a good and P is the price of that good. Besides, the supply curve of that Company is $Q_S = -4 + 2P$, where Q_S is the quantity supply of a good.
- Determine the values of P and Q using simultaneous equations.
 - Draw the graph of supply and demand.
- ii) The total revenue obtained (in \$000) from selling x hundred items in a particular day is given by R , which is a function of variable x . Given that $dR/dx = 20 - 4x$
- Determine the total revenue function R
 - Find the number of items sold in one day that will maximize the total revenue and evaluate the total revenue.
- Q2. The firm XYZ is under monopolistic competition in Kenya in which there is free entry and exit while the product is a bit differentiated. The demand function for the product is $Q = 100 - 0.5P$ while the total cost function is $C = 1562.5 + 5Q + Q^2 + 0.05Q^3$
- Calculate the profit maximization level of output? **(10 marks)**
 - Calculate the maximum profit for XYZ? **(5 marks)**
 - Compute the super normal profit per output? **(5 marks)**

- Q3. i) In a class of 120 students numbered 1 to 120, all even numbered students opt for Physics, whose numbers are divisible by 5 opt for Chemistry and those whose numbers are divisible by 7 opt for Math. How many opt for none of the three subjects?
- ii) Using practical example, discuss the advantages of linear and non-linear functions in business management. **(5 marks)**

- Q4. A garden shop wishes to prepare a supply of special fertilizer at a minimal cost by mixing two fertilizers, A and B. The mixture is to contain:
at least 45 units of phosphate
at least 36 units of nitrate
at least 40 units of ammonium
Fertilizer A costs the shop \$.97 per pound. Fertilizer B costs the shop \$1.89 per pound.
Fertilizer A contains 5 units of phosphate and 2 units of nitrate and 2 units of ammonium.
Fertilizer B contains 3 units of phosphate and 3 units of nitrate and 5 units of ammonium. How many pounds of each fertilizer should the shop use in order to minimize their cost? **(20 Marks)**

END