THE CATHOLIC UNIVERSITY OF EASTERN AFRICA

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MAIN EXAMINATION

AUGUST - DECEMBER 2016 TRIMESTER

FACULTY OF COMMERCE

DEPARTMENT OF ACCOUNTING AND FINANCE

EVENING PROGRAMME

CMS 121: BUSINESS MATHEMATICS

Date: DECEMBER 2016	**Duration: 2 Hours**
INSTRUCTIONS: Answer Question ONE and ANY OTHER TWO Questions	

Q1. Write short notes on the following

a) A set **(1 Mark)**

b) Finite and Infinite sets **(2 Marks)**

c) Find the derivative of $y = \frac{7x-2}{4x^2+4}$ **(3 Marks)**

d) Given that$y = x^3 - 6x^2 - 10$, identify the stationary points and determine whether they are maximum or minimum turning points. **(4 Marks)**

e) Given that the price of an item is Kshs. 350 when 250 items are demanded, but when only 50 items are demanded the price rises to Kshs. 550 per item. Identify the liner demand function and determine the price per item at a demand level of 115. **(4 Marks)**

f) Solve for x in the following$\frac{4}{x-2} + \frac{4}{3} = \frac{8}{3}$ **(4 Marks)**

g) Evaluate $\int (x^2 + 2)^6 \, 2x \, dx$ **(3 Marks)**

h) Given that the Average Fixed cost (AFC) = $\frac{100}{x}$ and the variable cost = $2x^2 - x$, where x is the quantity produced. Determine

a. The total cost function **(3 Marks)**
b. The average cost function **(3 Marks)**
c. The marginal cost function **(3 Marks)**

Q2. a) The figure below shows the output (in thousands of Tons) and expenditure on every £ for a firm over ten periods

Output	20	22	25	26	21	23	28	20	25	29
Expenditure	106	138	158	172	120	142	184	102	164	192

i) Find the linear relationship of energy expenditure (Y) on the output (X) **(8 Marks)**

ii) Estimate the energy expenditure if the following month output is planned at 2700 tons **(4 Marks)**

(b) Out of 1000 students who appeared for a semester exam, 750 failed in mathematics, 600 failed in accounts and 600 failed in costing, 450 failed in both mathematics and accounts, 400 failed in both mathematics and costing while 150 failed in both accounts and costing. The students who failed in all the three subjects were 75. Prove that the above data is inconsistent. **(8 Marks)**

Q3. a) Solve the following equations using matrix method **(8 Marks)**

3x-y+z=5
2x+2y+3z=4
X+3y-z=11

b) A company invested in a particular project and it has been established that after x months of running the cumulative profits (£ 000) from the project is given by the function$31.5x - 3x^2 - 60$, where x represents time in months. The project can be run for nine months at the most.

a) Sketch a graph which represents the production function **(6 marks)**
b) Determine the break even time points for the project **(2 Marks)**
c) What is the initial cost of the project **(2 Marks)**
d) Use the graph to estimate the best time to end the project. **(2 Marks)**

Q4. a) A sales manager of some firm wishes to study the characteristics of the revenue received by his firm. He notices that when P=kshs 3, the level of output sold is 10. However when price goes up by Kshs. 2, the quantity sold is 2 units. Assuming a linear relationship determine,

i) Demand function **(3 Marks)**
ii) Total revenue function **(3 Marks)**
iii) AR function **(3 Marks)**
iv) MR function **(3 Marks)**
v) Comment on your results in (i) and (iii) above **(1 Marks)**

b) Find the area bound by the curve $y = 2x^2 - x + 3$ and the curve $y = 2x^2 - x + 3$ and the x axis and the ordinates x=-1 and x=2 **(7 Marks)**

END