GRETSA UNIVERSITY - THIKA

UNIVERSITY EXAMINATIONS

JANUARY – APRIL 2017 SEMESTER

BACHELOR OF COMMERCE

COURSE CODE: BCBA 103

COURSE TITLE: BUSINESS MATHEMATICS

DATE: 7 APRIL 2017 **TIME: 11.30 AM – 2.30 PM**

INSTRUCTIONS TO CANDIDATES

1. SECTION A IS **COMPULSORY.**
2. SECTION B: ANSWER ANY OTHER **THREE** QUESTIONS.
3. **DO NOT** WRITE ANYTHING ON THIS QUESTION PAPER AS IT WILL BE AN EXAM IRREGULARITY.
4. ALL ROUGH WORK SHOULD BE AT THE BACK OF YOUR ANSWER BOOKLET AND CROSSED OUT.

CAUTION: All exam rooms are under CCTV surveillance during the examination period.

SECTION A: COMPULSORY

Question 1

a) Evaluate $\int(8x^3 - 3x^2 + 6x - 10)dx$ ***(3 Marks)***

b) The total revenue obtained from selling 'x' hundred items in a particular day is given by 'R' which a a function of variable 'x'. The marginal revenue MR=20-4x.
Required;

i. Determine the total revenue function ***(5 Marks)***

ii. Find the number of items sold in one day that will maximize the total revenue and evaluate the total revenue at that point. ***(5 Marks)***

c) A shop buys 200g packets of Tea and 500g packets of Coffee. Tea costs 50 shillings each and Coffee costs 70 shillings per packet. There is a maximum of Ksh. 3,000 to spend;

i) Formulate an inequality to represent this information ***(5 Marks)***

ii) The number of coffee packets should not be greater than the tea packets. Write down an inequality to show this information**.** ***(5 Marks)***

iii) There must be at least 40 packets of Tea. Write down an inequality to show this information**.** ***(3 Marks)***

iv) What is the maximum number of Tea packets the trader can buy if he has to buy 5 packets of Coffee? **.** ***(7 Marks)***

d) Two dice are thrown once on the table. Assuming both dice are unbiased;

i) Draw a table of the sample space ***(4 marks)***

ii) What is the probability of drawing (5,4) in both the dice ***(3 marks)***

SECTION B: ANSWER ANY THREE QUESTIONS

Question 2

a) Differentiate the following with respect to 'x'.

$i)\ y = \sqrt{3x^2 - 4}$ ***(2 marks)***

$ii)\ y = (x^2 - 1)(4x^3 - 5)$ ***(2 marks)***

iii) $y = \ln(x^2 - 5x + 6)$ ***(3 marks)***

$iv)\ y = e^{lnx}$ ***(3 marks)***

iv) $y = x^2 e^x$ ***(3 marks)***

b) The profit function of a certain firm is given by the following function;
$\pi = aQ^2 + bQ + c$
It is known that if $\pi = 9,\ 34\ and\ 19\ when\ Q = 1,\ 2\ and\ 3\ respectively.$
i) Solve for the values of a, b and c. ***(3 marks)***
ii) Determine the breakeven point. ***(4 marks)***

Question 3

The table below shows the unit price of a certain product and the corresponding quantity demanded.

Price(Ksh) 'P'	40	44	48	52	56	60
Demand Quantity('000kg) 'Q'	64	56	48	40	32	24

Required;
a) Plot a graph of the unit price against the demand quantity ***(5 marks)***
b) Use your graph to derive an equation for the unit price, 'P', in terms of the demand 'Q'. ***(5 marks)***
c) What would be the quantity demanded for a price of 70? ***(5 marks)***
d) Determine the quantity and the price that should be charged to maximize the profit. ***(5 marks)***

Question 4

a) Consider the following consumption function;

$C = 2.6 + 0.65Y^d$ Where $Y^d = Y - T\ and\ T = tY$

i) Express consumption C as a function of total income Y. ***(5 marks)***
ii) Find the level of C if t=0.3 and Y=100 ***(5 marks)***

b) Given the following investment and import function;

$$S = \beta_0 + \beta_1 Y$$

X=100

i) Determine the values of S and X at the following levels of income; Y=0; 100. ***(4 marks)***
ii) If income drops by 100, what proportion of that drop will be a drop in savings? ***(3 marks)***
iii) Will the drop in income affect exports? Explain. ***(3 marks)***

Question 5

a) A company produces two goods A and B and the prices are given below;

$P_1 = 50 - x$

$P_2 = 95 - 3y$

The total cost function is given as $C = x^2 + 3xy + y^2$;

i) Determine the profit function 'π" ***(4 marks)***

ii) Determine the value of x and y that maximizes profit. ***(3 marks)***

iii) Deduce the corresponding prices ***(3 marks)***

b) The total profit per acre on a wheat farm has been found to be related to the expenditure per acre for labour and soil improvement as in the following function;

$$Profit = 48x + 60y + 10xy - 10x^2 - 6y^2$$

Where x = Expenditure per acre spent on labour

y = Expenditure per acre spent on soil improvement

Determine;

i) The value of 'x' that maximizes profit ***(4 marks)***

ii) The value of 'y' that maximizes profit ***(4 marks)***

iii) Maximum profit ***(2 marks)***