KABARAK **UNIVERSITY**

EXAMINATIONS

2008/2009 ACADEMIC YEAR

FOR THE DEGREE OF BACHELOR OF COMMERCE

COURSE CODE: **FNCE 120**

COURSE TITLE: **MANAGEMENT MATHEMATICS I**

STREAM: **Y1S2**

DAY: **THURSDAY**

TIME: **11.00-1.00 P.M.**

DATE: **18/12/2008**

INSTRUCTIONS:

Answer question **ONE** and any other **TWO**

PLEASE TURN OVER

QUESTION ONE 30 (MARKS)

a) If T = {4, 7, 8} obtain the power set **(4mks)**

b) Given the following sets A = {1, 2, 3, 4, 5}

$$B = \{1, 3, 5, 7, 9\}$$
$$C = \{2, 4, 6, 8, 10\}$$

Find

(i)A union B (ii) A union C (iii) B union C

(iv)   A Intersection B (v) A intersection C (vi) B intersection C **(6mks)**

c) Simplify 2 log $_2$ x – 3 log $_2$ 2x + log $_2$ x^2 **(4mks)**

d) Find y interms of x when

2log $_3$ y – 3log $_3$ x^2 = log $_3\sqrt{y}$ + log $_3$ x **(4mks)**

e) Determine the break-even quantity of XYZ manufacturing Co. given the following data: Total cost ksh 1200; Variable cost per unit ksh 2; Total revenue for selling q units $y_{TR} = 100\sqrt{q}$ **(6 marks)**

f) Integrate the following function

$$\int (2x+7)^6 dx \quad \textbf{(6 marks)}$$

QUESTION TWO (20 MARKS)

a) Two points on a linear supply function are (10, 30,000) and (15, 60,000)
   i) Determine the supply function q=f (p) **(4mks)**
   ii) What price would results in supplier offering 50,000 units **(2mks)**
   iii) Determine and interpret the P intercept **(4 mks)**

b) Differentiate the following functions
   i) $y = (5x+7)(3x^2 +5)$ **(5marks)**

   ii) $y = \dfrac{4x^2 + 2}{x^6}$ **(5marks)**

QUESTION THREE (20 MARKS

a) A businessman conducted a survey to determine the demand function for a product. Consumers were asked questions if they would purchase the product at various price and from their responses constructed estimates of market demand at various market prices. After sample data points were plotted, it was concluded that the

demand relationship was estimated best by a Quadratic function. Researchers concluded that the quadratic representative was valid for prices between 5 and 45. Three data points chosen for fitting the curve were (5, 2025), (10, 1600) and (20, 900).

Determine the Quadratic demand function and sketch the curve. (**12mks**)

b) Find the first and the second order derivatives of $Z = 3x^2 + xy - 2y^2$ (**8 marks**)

QUESTION FOUR (20 MARKS)

a) The supply and demand function for a product are $q_s = p^2 - 200$ and $q_d = p^2 - 20p + 2200$. Determine the market equilibrium price and the quantity (**6 marks**)

b) If a manufacturers average-cost equation is $\bar{c} = 0.0001q^2 - 0.02q + 5 + \dfrac{500}{q}$.

    i)   Find the marginal- cost function (**9 marks**)

    ii)   What is the marginal cost when 50 units are produced (**5 marks**)

QUESTION FIVE (20 MARKS)

a) Examine the following for any critical region and determine their nature
$$f(x) = -4000e^{-0.01x} - 30x + 400 \qquad \textbf{(12 marks)}$$

b) Find the limits of the following:

    i) $\displaystyle l\,im_{x \to 3} \frac{x^2 - 3x}{x + 7}$ (**4 marks**)

    ii) $\displaystyle \lim_{x \to \infty} \frac{5x^2 + 3}{3x^2 - 2}$ (**4 marks**)