KABARAK UNIVERSITY

UNIVERSITY EXAMINATIONS

2009/2010 ACADEMIC YEAR

FOR THE DEGREE OF BACHELOR OF COMMERCE

COURSE CODE: FNCE 120

COURSE TITLE: MATHEMATICS

MANAGEMENT I

STREAM: Y1S2

DAY: TUESDAY

TIME: 3:00 – 5:00 P.M.

DATE: 06/04/2010

INSTRUCTIONS:

1. Answer question ONE and ANY OTHER TWO questions.

PLEASE TURNOVER

QUESTION 1

a) Define the term break-even point. (1 mark)

b) Highlights the five assumptions of breakeven analysis. (5 marks)

c) A group of engineers interested in forming a company to produce smoke detectors. They have developed a design and estimate that variable cost per unit, include materials, labour and marketing costs, are $22.50. Fixed cost associated with the formation, operation and management of the company and the purchase of equipment and machinery total $ 250,000. They estimate that the selling prices will be $30 per detector.

    (i)   Determine the number of smoke detectors which must be sold in order for the firm to break even on the venture.

    (ii)   Firm to break even on the venture. Preliminary marketing data include that the firm can expert to sell approximately 30,000 smoke detectors over the life of the project if the detectors are sold for $ 30 per unit. Determine expected profit at this level of out put. (8 marks)

d) (i) Define the following terms as used in set theory.

    a) Intersection of sets. (1 mark)

    b) Union of sets. (1 mark)

    c) Venn diagram. (1 mark)

    (iii)   Give that

        U =(x^{1}x is a positive integer less than 15)

        and   A=(2,3,5,7)

               B=(1,2,3,4,5,6,7,8,9,10-

               C = (2, 6, 8, 10)

Find

    a) AụB,

    b) AήB

    c) A^{1}ήB^1 (3 marks)

d) Valuate the lin $\dfrac{x^2-9}{X\to3x^25x+}$ (3 marks)

e) If y = 3x4-4x3+15x2 fine. (3 marks)

    (i) $\dfrac{dy}{dx}$

    (ii) $\dfrac{d^2y}{dx^2}$

f) Evaluate $f(x^2 + 1)(2x^3 - 3)dx$

g) A manufacturer know that if x (hundred) products demanded in a particular week. The total cost function (ƒ000) is 14+3x and the total revenue function. Function (ƒ000) is $19x-2x^2$

a) Derive the total profit function.
b) Find the profit break-even points
c) Calculate the level of demand that maximizes (that is maximum profit point) and the amount of profit obtained? (5 marks)

QUESTION 2

a) In a certain group of 75 students, 16 students are playing football, volleyball and basketball 24 students are playing football, 22 students play volleyball and basketball. However, 7 students play football only, 10 play volleyball, and 5 play basketball only.

Required:

(i)   How many students play football
(ii)   How many students play football and basketball but not volleyball?
(iii)   How many students in this group who are not play any of the three games?(10 marks)
b) Solve the following equation,
(i) $(x-3)^2 +(2x+1)^2 = 5(x-1)^2$ (5 marks)
(ii)   Find the maximum profit if R=30x-x^2 and C = 20 +4x (5 marks)

QUESTION 3

a) Evaluate the integral $\dfrac{(ax2+c)dx}{\sqrt{x}}$ (5 marks)

(i)   Evaluate
Lin

$x \longrightarrow 1$ $\dfrac{x^2+x-2}{x^2-3x+2}$ (5 marks)

b) A party of 150 people planned to visit East Africa. Three fell ill and did not arrive of the other, 6 visited Kenya, Uganda and Tanzania 8 visited Uganda and Tanzania. (thus includes those who visited all the three countries, 26 Tanzania and Kenya and Kenya 17 visited Kenya and Uganda. Also 27 visited Kenya but no other country and 45 visited Uganda only.
(i)   How many visited Tanzania only?
(ii)   How many visitors did each country have? (10 marks)

QUESTION 4

a) 12 monthly payment of $f100$ are made into a building society account which pays a fixed nominal rate of 10.75%, compounded monthly. How much is the account wonde at the end of the year? (10 marks)

b) Given that $= \{x/x$ is a positive integer less than 20 $\}$

   A = 5,10,15, B= 2,8,10 C= 1,5,9,15,17

   Find

   AήB. (1 mark)

   A1ήB1. (2marks)

   AήBήC. (2 marks)

   A1ήC1. (2 marks)

c) Determine

$$\int_{1}^{4}(8x^3 +6x^2-10x+5)\, dx$$ (3 marks)

QUESTION 5

a) The demand for the product of a firm varies charges for the products. The firm estimates that annual total revenues P (stated in dollars). Specifically R = (P) = -50p2 + 500P

Required:

(i)   Determine the price which should be charged in order to maximize total revenue.

(ii)   What is the maximum value of annual total revenue? (10 marks)

b) Evaluate the limit $x \longrightarrow 3$ $\dfrac{x^2-9}{x^2-6x+9}$ (6 marks)

c) If y= 3x4-4x2+18x find

(i) $\dfrac{dy}{dx}$ (2 marks)

(ii) $\dfrac{d^2y}{dx^2}$ (2 marks)