MURANG'A UNIVERSITY COLLEGE

(A constituent college of JomoKenyatta University of Agriculture and Technology)

HBC 2110: MANAGEMENT MATHEMATICS I

END OF SEMESTER EXAMINATIONS

FOR BACHEOR OF SCIENCE IN HUMAN RESOURCE MANAGEMENT

2013/2014 ACADEMIC YEAR **YEAR I, SEMESTER I**

Instructions

i. Answer Question ONE and ANY OTHER TWO Questions
ii. Show all your workings
iii. Time Allowed: 3 hour

QUESTION ONE

a. Kangema workshops produce and sell T-doors in the nearby Mukuyumarket and has the following marginal cost function at x level production; $MC=4x^3-120x+600$. The workshop has a fixed cost of sh.40,000.
   i. Derive the total cost function of Kangema workshops at x level of production (5 marks)
   ii. If the workshop has received an order of 100 T-doors from Murang'a University, how much will it cost them to make the doors (4 marks)

b. The price of an item is sh. 35 when 250 items are demanded but when only 50 items are demanded, the price rises to sh. 55 per item. The production cost is given by 5q + 200
   i. Derive a linear price function (5 marks)
   ii. What is the firm's revenue function (5 marks)
   iii. Determine the firms marginal revenue function at q production level (3 marks)
   iv. What is the maximum profit attainable by the firm (5 marks)
   v. What price should the firm charge to maximise profit (2 marks)

QUESTION TWO

a. Murang'a College of professionals offers a ten-stage diploma in secretarial studies. The college fees arrangement is such that a student pays sh.25,000 in the first stage and provides for a regular increase of sh.3500 for every subsequent stage.
   i. How much will a student pay in the final stage (5 marks)
   ii. In total, how much should a student pay in order to complete the whole course(5 marks)

b. A student wants to accumulate sh.60,000 for his graduation party after his 4-year degree course. At 10% interest rate, how much should the student deposit in a bank account at the end of every year to achieve his dream (4 marks)

c. Briefly explain the following types of functions specifying the general form for each

(6 marks)

i. Linear function

ii. Quadratic function

QUESTION THREE

a. National water board carried out a survey on the sources of household water in a town estate and found out that 60% of the households used piped water, 48% had their own boreholes while 20% had their own boreholes and also used piped water. Using venn diagrams to illustrate your answer, find the percentage of households who;
   i. Got water from at least one of the sources (5 marks)
   ii. Did not get water from any of the two sources (5 marks)

b. Giving a valid example, explain the various ways in which sets can be specified (6 marks)

c. From the following function, calculate the gradient when x = 5. $y=3x^2-4x+8$ (4 marks)

QUESTION FOUR

a. A project costs sh.10 million to acquire and is expected to last for 5 years with salvage value of sh.800000. The project generates year-end cash flows of sh.4 million, sh.3.8 million, sh.2.6 million, sh.2 million and sh.1 million and the firm requires a 10% return on such projects. Evaluate the project using
   i. Payback period method (6 marks)
   ii. Net present value method (5 marks)
   iii. Why is the Net present value method superior to pay back period (2 marks)

b. A contract employee who received a fixed increment in his salary had a final salary of sh. 18,800 after ten months. If his total salary was sh. 134,000 over the ten months, what was his initial salary and the fixed increment (7 marks)