

**W1-2-60-1-6**

**JOMO KENYATTA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY**

**UNIVERSITY EXAMINATIONS 2015/2016**

**YEAR I SEMESTER II EXAMINATION FOR THE DEGREE OF BACHELOR OF HUMAN RESOURCE MANAGEMENT**

**HCB 2111: MANAGEMENT MATHS II**

**DATE:DECEMBER 2015 TIME: 2 HOURS**

**INSRUCTIONS:** Answer question one and any other two questions

QUESTION ONE

i.   , 

Find ABC

ii. Find the inverse of the matrix



iii. Solve the following simultaneous equation by matrix method.

2x-2y+5z=1

2x-4y+8z=2

-3x+6y+7z=1

iv. Three clients of Uchumi Industries Ltd, namely P, Q and R are direct competitors in the retail business. In the first week of the year, P had 300 customers, Q had 250 customers and R 200 customers. During the second week, 60 of the original customers of P transferred to R. Similarly in the second week 50 customers of Q transferred to P with no transfers to Q.

a. Display the information in a matrix form, the patterns of retention and transfers of customers from the firsts to the second week.

b. Re-express the matrix obtained in (a) showing the elements as decimal fractions of the original numbers of customers of P, Q and R. Refer to this matrix as T.\

c. Multiply matrix T by itself to determine the proportions of the original customers have been retained or transferred to P, Q and R from the second to the third week.

d. Solve the matrix equation.

(x,yz)T=(x,y,z)

given that x+y+z=1

e. Interpret the result that you have obtained in part (d) in relation to the movement of customers between P Q and R.

QUESTION TWO

A chocolate manufacturer produces two kinds of chocolate bar, x y which are made in three stages: blending, baking and packaging. The time in minutes, required for each box of chocolate bars in as follows:

|  |  |  |  |
| --- | --- | --- | --- |
|  | Blending | Baking | Packaging |
| X | 3 | 5 | 1 |
| Y | 1 | 4 | 3 |

The blending and packaging equipment is available for 15 machine hours, and the baking equipment is available for 30 machine hours.

The contribution on each box of x is £2. The machine time may be used for either x or y at all times is available.

All production must be sold.

Required

a. State the equations/inequalities which describe the production conditions. (6 marks)

b. Draw a graph of these equations/inequalities which describe the production conditions and hence find how many boxes of each chocolate bar the manufacturer should produce to maximize contribution. (8 marks)

c. State the maximum contribution and comment on your answer. (6 marks)

QUESTION THREE

a. A company invests in a particular project and it is estimates that after x months of running the cumulative profit (£000) from the project is given by the function

Y=31.5x -3x2 -60 where x represents time in months. The project can run for nine months at the most.

i. Draw the graph y=31.5x-3x2-60 which represents the profit function. (8 marks)

ii. Calculate the break-even time points for the project. (4 marks)

iii. What is the initial cost of the project? (2 marks)

iv. Use the graph to estimate the best time to end the project. (2 marks)

b. Solve the cubic equation 2x3-5x2-2x+5=0. (4 marks)

QUESTION FOUR

Your firm has recently started to give economic advice to your clients. Acting as a consultant, you have estimated the demand curve for a clients firm to be

AR=200-8x where AR is average revenue (£) and x is output. Investigation of the clients firm’s cost profile shows that marginal cost is given by

MC=x2-28x+211

where MC is marginal cost (£). Further investigation has shown that the firms output are £10.

a. If the total cost is integrated of marginal cost, find the equation of total cost.

(4 marks)

b. If the total revenue is average multiplied by output, find the equation of total revenue.

c. Profit is total revenue minus cost. Using the methods of differentiation finding the turning points, say whether these points are maxima or minima. (4 marks)

d. Marginal revenue is the first differential of total revenue find the equation of marginal revenue. (4 marks)

e. On the same axes, sketch the marginal cost and marginalia revenue curves.

(4 marks)

QUESTION FIVE

a. i If y=4x3-6x2-72x+100, find the maxima and minima. (4 marks)

ii. y= find dy/dx (2 marks)

iii. find dy/dx. (2 marks)

iv. y=(x2+1) (x3+3) find dy/dx (2 marks)

v. y=x4+6x2=9x+15, find dy/dx, d2y/dx2,

 (4 marks)

vi. y=x56x find dy/dx. (2 marks)

vii. y=x7+6x-6-50 +log x,

find dy/dx. (2 marks)

viii. y= find dy/dx. (2 marks)

QUESTION SIX

i. (2 marks)

ii.  (2 marks)

iii. S  (2 marks)

iv.  (2 marks)

v.  (3 marks)

vi.  (3 marks)

vii.  (3 marks)

viii.  (3 marks)