JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

SCHOOL OF MATHEMATICS AND ACTURIAL SCIENCE

UNIVERSITY EXAMINATION FOR DEGREE OF B.sc. (CUMMUNITY HEALTH AND PUBLIC HEALTH)

1ST YEAR SEMESTER 2018/2019 ACADEMIC YEAR

KISUMU LEARNING CENTRE

COURSE CODE: SMA 3121

COURSE TITLE: MATHEMATICS II

DATE : 15/08/2019 EXAM SESSION: 2.00 – 4.00 PM

TIME: 2 HOURS

Instructions

1. **Answer question One (compulsory) and ANY other two questions**
2. **Candidates are advised not to write on the question paper.**
3. **Candidates must hand in their answer booklets to the invigilator while in the examination room.**

SECTION A:

QUESTION ONE COMPULSORY (30 MARKS)

a) Differentiate y = $\frac{6x^3+14x^2-12x}{3x-2}$ (5 mks)

b) Use matrix to solve

2x+3y = 600

X+2y=350 (5mks)

c) Evaluate $\int \frac{2x+3}{x^2+3x+4}$ (5mks)

d) Find $\lim_{x\to 1} \frac{x^3-1}{x-1}$ (5mks)

e) Given the co-ordinates of A and B as (2,2) and (10,2) respectively, find the equation of the perpendiculars bisector of AB (5mks)

f) Given that;

$B = \begin{bmatrix} 4 & 1 & 0 \\ 2 & -3 & 1 \\ 0 & 2 & 3 \end{bmatrix}$ and $M = \begin{bmatrix} 6 & 3 & 0 \\ 0 & 1- & 2 \\ -3 & 3 & 1 \end{bmatrix}$

Find 1/3 M – ½ L

SECTION B

Answer Any Two Questions from This Section

A Triangle has vertices A (2, 5), B(1-2) and C(-5,1). Determine;

a) The equation of the line BC (5mks)

b) The equation of the perpendicular line from A to BC (5mks)

c) Find the equation of a line whose x-intercept is – 8 and y - intercept is 6 (5mks)

d) Draw the graph of a line passing through (3, -4) and has a gradient of 2 (5mks)

QUESTION 3 (20 MARKS)

Consider the matrix given below,

$$A = \begin{bmatrix} 1 & 1 & -1 \\ 1 & 2 & -2 \\ -2 & 1 & 1 \end{bmatrix}$$

i) Find the co-factors of matrix A (2mks)

ii) Find the determinant of the matrix (2mks)

iii) Determine the adjoint of the matrix A (4mks)

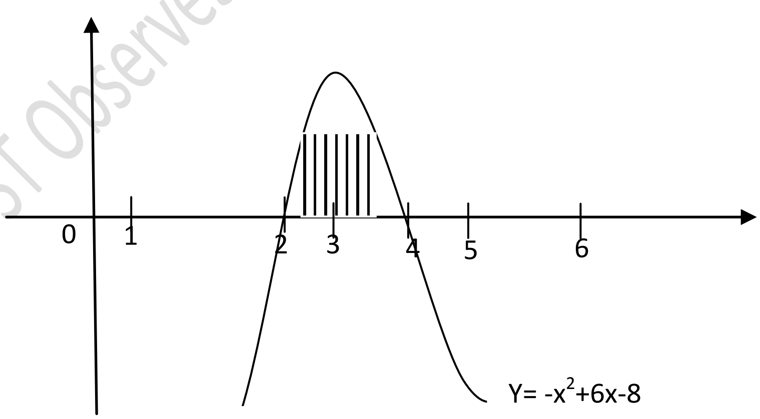
iv) Hence, find the inverse of matrix A (2mks)

v) Using the matrix in (iv) above to solve the system of equations below;

x+y - z = 7
x+2y-2z =12
-2x+y+z=-3 (10mks)

QUESTION 4 (20 MARKS)

a) Calculate the shaded area in the figure below



(8 mks)

b) The velocity V of a particle is 4m/s. Given that s = 5 when t = 2 second

i) Find the expression of displacement in terms of time (4mks)

ii) Find the;

a) Distance moved by the particle during the fifth second (4mks)

b) Distance moved by the particle between t = 1 and t = 3 (4mks)

QUESTIONS 5 (20 MARKS)

a) Evaluate $\int_1^6 (x^2 - 12x + 10)dx$ (6mks)

b) As blood moves from the heart through the major arteries out to the capillaries and back through the veins, the systolic blood pressure continuously drops. Consider a person whose systolic blood pressure P (in millimeters of mercury) is given by

$P = \frac{25t^2+125}{t^2+1}$, find the rate at which the systolic pressure is increasing when t = 3s

c) Find the derivative of ;

$f(x) = \text{In}\ (x(x^2+1)^2$ (6mks)