



JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY
SCHOOL OF MATHEMATICS AND ACTUARIAL 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 2111	
COURSE TITLE	:	MATHEMATICS I	
EXAM VENUE	:		
STREAM PH/CH	:		
DATE	:	14/08/19	
TIME	:	1 ½HRS	EXAM SESSION : 9.00 – 11.00am

Instructions

1. Answer question 1 (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.

QUESTION ONE (COMPULSORY) (30 MARKS)

- a) Let f_1 , and f_2 be functions from \mathbb{R} to \mathbb{R} such that $f_1(x) = x^2 + 5x + 7$
And $f_2(x) = (x-2)$, what are the functions
Find the unknown in the equation below,
- i) f_1, f_2 (3mks)
 - ii) $f_2, -f_1$ (2mks)
 - iii) $f_1 + f_2$ (2mks)
- b) Simplify by rationalizing the denominator $\frac{8}{\sqrt{5} + \sqrt{2}}$ (5mks)
- c) Use the quadratic formula to solve
 $2x^2 - 5x - 3 = 0$ (5mks)
- d) Expand and simplify $(1+x)^6$ (5 mks)
- e) Solve the equation
 $3^{4x} \div 3^{-7} = 3^{15}$ (5mks)
- f) The mean of the numbers 3,4,a,5,7,a,5,8,5 and 9 is equal to the mode. Find the value of a and hence the median of the data (3mks)

QUESTION TWO (20 MARKS)

Let $U = \{1,2,3,4,5,6,7,8,9\}$

- a) A = $\{2,3,4,5,6,7,8\}$
- B = $\{3, 4, \dots, 8\}$
- C = $\{1,2,3,4\}$ and
- D = $\{4, 6, 7, 9\}$

Find

- (i) $(A \cap B) \cap (C \cap D)$ (3mks)
- ii) $(A \cap B) \cap (C \cap D)$ (4mks)

- iii) $(B \cap D)^c$ (4mks)
- b) Draw a standard venn diagram to show the region corresponding to the given expression $(A \cap C^1) \cup B^1$ (6mks)
- c) What is the power set of $\{0, 1, 2\}$? (3mks)

QUESTION 3 (20 MARKS)

- a) A customer deposited Shs. 14,000 in a savings account. Use step by step method, to find the accumulated amount after one year if interest was paid at 12% p.a. compounded quarterly (8mks)
- b) Juma invested a certain amount of money in a bank which paid 12% p.a. simple interest. After 5 years his total savings were Shs. 5,600, determine the amount of money he invested (8mks)
- c) Statistics from a town in Kenya indicate that 160,000 people are HIV positive. It has also been established that the rate of its spread in this town is 8% p.a. How many people will be carriers in 6 years time?

QUESTION 4 (20 MARKS)

Evaluate

- a) $P(7, 3)$ (3mks)
- b) $C(15, 7)$ (3mks)
- c) In how many ways can a committee consisting of 2 faculty members and 3 students be formed if 6 faculty members and 12 students are eligible to serve in the committee (6mks)
- d) Solve triangle PQR in which $P=10.4\text{cm}$ $Q = 25.6\text{cm}$ and $\angle R=88^\circ$ (8mks)

QUESTION 5 (20 MARKS)

The examination marks in a mathematics test for 20 first year diploma students were as follows;

43	38	39	37	33
31	28	35	27	32
29	30	34	44	24
32	34	41	36	38

Using class interval of 3, that is 28-30, 33

Make a frequency distribution table and from it

- a) Determine the modal class
 - b) Estimate
 - i) The mean
 - ii) The median
 - c) Draw a bar graph to represent the information
- (12mks)
- (8mks)



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1ST YEAR SEMESTER 2017 /2018 ACADEMIC YEAR

KISUMU LEARNING CENTRE

COURSE CODE : SMA 211
COURSE TITLE : MATHEMATICS II
EXAM VENUE : STREAM DIP CHD
DATE :
TIME 2HRS :
EXAM SESSION : 9:00am – 11:00am

Instructions

4. Answer question 1 (compulsory) and ANY other two questions
5. Candidates are advised not to write on the question paper.
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SECTION A:

QUESTION ONE COMPULSORY (30 MARKS)

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

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 $\lim_{x \rightarrow 1} \lim_{n \rightarrow \infty} n$

e) Given the co-ordinates of A and B as (4,2) and (8,2) respectively, find the equation of the perpendicular bisector of AB (5mks)

f) Given that;

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

Find $\frac{1}{3}M - \frac{1}{2}L$

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 -3 and y-intercept is 6 (5mks)
- d) Draw the graph of a line passing through $(0, -4)$ 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 solve the system of equations below;

$$x + y - z = 7$$

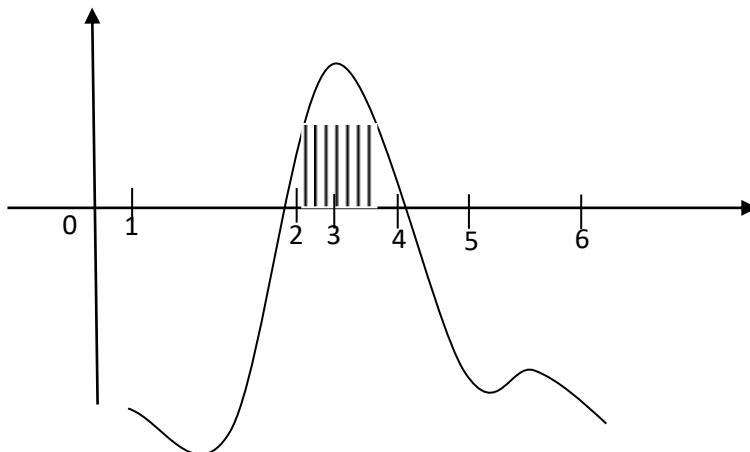
$$x + 2y - 2z = 12$$

$$-2z + y + z = -3$$

(10mks)

QUESTION 3 (20 MARKS)

- a) Calculate the shaded area in the figure below



$$Y = -x^2 + 6x - 8$$

(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 $\int^6(x^2-12x+10)dx$ (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

$$P = \frac{25+t^2+125}{t^2+1}$$

c) Find the derivative of ;

f(x) = ln [Type equation here.

d)