



MACHAKOS UNIVERSITY

University Examinations 2018/2019

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF MATHEMATICS STATISTICS AND ACTUARIAL SCIENCE

FIRST SECOND SEMESTER EXAMINATION FOR

CRAFT CERTIFICATE IN MECHANICAL ENGINEERING

1501/103: MATHEMATICS I

DATE: 16/4/2019

TIME: 8:30 – 10:30 AM

INSTRUCTIONS:

Answer all the questions

Show all your working clearly

QUESTION ONE

a) Simplify

i) $6a^3 b^6 \div 3a^2 b^3$

ii) $(3^2 \times a^3 \times b)^3$

iii) $\frac{1}{2} \log_3 81$

iv) $2 \log 7 - \log 49$

(10 marks)

b) Given that $F = \frac{1}{2}m(v^2 - u^2)$

i) Make m the subject of the formula

ii) Find the value of m if $f=1136$, $v=14.8$ and $u=9.24$

(4 marks)

c) Use logarithms to evaluate

$\left(898 \times \frac{10.2}{5.043}\right)^{1/3}$

(6 marks)

QUESTION TWO

a) Solve the following equations

i) $5x+2y=6$

$$7x-2y=6$$

ii) $3x^2-4x-15=0$

b) Find the sum of the following series

(10 marks)

$$17+17\frac{1}{4}+17\frac{1}{2}+\dots\dots\dots \text{to 21 items}$$

(4 marks)

c) Given that $2+b+32+\dots\dots\dots$ form a G.P

Find

i) The value of b

ii) The common ratio

iii) The sum of the first 10 terms of G.P

(6 marks)

QUESTION THREE

a) Simplify the following ratios

i) $3^{5/6} : 1^{3/20}$

ii) 1m: 30cm

(5 marks)

b) A certain sum is divided in the ratio $1^{1/2} : 2^{1/3} : 3^{1/4}$ if the largest share is shs 156 what is the sum divided?

(4 marks)

c) Solve the following equation

i) $\frac{x+1}{3} - \frac{x-2}{4} = \frac{x}{6}$

ii) $3^{x+1}=81$

iii) $\text{Log}(3y+4)=\text{log}(y-2) +\text{log}9$

(11 marks)

QUESTION FOUR

a) Given that y is inversely proportional to x^2 and $y=100$ when $x=4$, determine
Y when $x=6$

X when $y=25$

(6 marks)

b) Express as fractions the difference between the largest and smallest of the following fractions $4/7, 5/8, 7/20$

(4 marks)

c) Evaluate $27.1 \div 13$, giving your answer correct to (i) 2 dp and (ii) 4sf

(3 marks)

d) A farmer divides his farm into three parts maize 6ha, coffee 8 ha dairy farming 26ha. draw a pie chart representing this information.

(7 marks)

QUESTION FIVE

- a) The age of a father is three times that of his son. The sum of their ages is 72 what are their ages? (5 marks)
- b) Simplify $3\{(2a+b)-(a-b)\}$ (3 marks)
- c) i) Draw the graph of $y = x^2 - 3x + 2 = 0$ for values of x between -1 and 4
ii) Use a graph in c (i) above to solve the following equations
- $X^2 - 3x + 2 = 0$
- $X^2 - 4x = 0$ (12 marks)