MACHAKOS UNIVERSITY

University Examinations for 2021/2022

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF MECHANICAL ENGINEERING

FIRST YEAR SEMESTER EXAMINATION FOR

CERTIFICATE IN ELECTRICAL ENGINEERING

1601/ 103. MATHEMATICS 1

DATE:25/11/2021   **TIME: 11:30 – 2:30 AM**

Instructions to candidates.

Answer all the questions

Show all your working clearly

QUESTION ONE

a)   Simplify $1 \div (4 \frac{3}{4} - \frac{1}{4}$ of $7\frac{1}{5})$ (4 marks)

b)   Arrange the following fractions in ascending order,
        (i) 3/10, 1/22, 9 / 55, $^7/_{20}$ (ii) 7/12, 9/16, 1/20, 5/18
                                                                        (6 marks)

c)   A man left 2/5 of his estate to his wife and this amounted to K £ 36,000, 1/5 of the remainder was left to a son and the rest to 3 daughters equally. How much did each daughter receive?
                                                                        (6 marks)

d)   Express the first quantity as a fraction of the second quantity.
        (i)   450g:2kg   (ii) 45sec : 1hr   (4 marks)

QUESTION TWO

a)   Evaluate the following

   (i)   Log 12.5 + log 8   (ii) $\log_2 32$

   (iii) $\dfrac{64^{1/2} + 4^{3/2}}{4}$ (iv) ¾ ÷ 5/16   (12 marks)

b)   Use logarithms to evaluate $\sqrt{\dfrac{820 \times 0.624}{11.23^2}}$ (8 marks)

QUESTION THREE

a)   Find the value of 13.2 x 0.0057 and
   i)   State the number of s.f
   ii)   Correct to 2 d.p   (4 marks)

b)   Simplify   i) $6a^2 \times 3a^3 \div 9a$
          ii) $\dfrac{(3x^2)}{9x^4}$ (6 marks)

c)   Without using tables or calculators, simplify the following:
   i)   Log 50 – log 100 + log 2
   ii)   Log 54 + 2 log (5/3) - log 15   (6 marks)
d)   (i) Express as a single logarithm 3 log 2 + 2 log3 – 2 log6
   (ii)   Express in index notation -3 = $\log_a x$ (4 marks)

QUESTION FOUR

a)   Find the value of: $\dfrac{27^{1/2} \times 243^{1/2}}{}$

                          (4 marks)
b)   Express the following as fractions

                          ..
   (i)   0.833 ……….   (ii) 1.227   (6 marks)
c)   (i) Solve the following equations
          4 log 2 + log 4 = x log 2 + log 8
   (ii)   Simplify: $\dfrac{p2x\ q^{5y}\ r^n}{p^{\ x}\ q^y}\ \div\ \dfrac{p^{3x}\ q^{\ 4y}\ r^{3n}}{p^{2x}}$ (10 marks)

QUESTION FIVE

a) Find the value of $x - y(x + z)$ if $z = 7$, $y = 2$ and $z = 1\frac{1}{2}$

(3 marks)

b) A book is 4.5 cm thick and each cover is 1.5 mm thick. How many pages are there if each page is 0.35mm thick? (4 marks)

c) Find the HCF and LCM of 84, 126 and 210. (7 marks)

d) Write down the following numbers in standard form and the accuracy stated in brackets.
   i)   9732.023 (3 s.f)
   ii)   84.905   (2 d.p)
   iii) 0.24706 (1 s.f)   (6 marks)