MACHAKOS UNIVERSITY

University Examinations 2016/2017

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF MATHEMATICS AND STATISTICS

FIRST YEAR FIRST SEMESTER EXAMINATION FOR

CERTIFICATE IN BUILDING AND CIVIL ENGINEERING

CERTIFICATE IN ELECTRICAL ENGINEERING

CERTIFICATE IN MECHANICAL ENGINEERING

SUPPLEMENTARY EXAMINATION

EPC 100: MATHEMATICS

DATE: 29/8/2017 **TIME: 8:30 – 10:30 AM**

INSTRUCTIONS

Answer question ONE (Compulsory) and any other TWO questions

QUESTION ONE (COMPULSORY)

a) Make L the subject of the formula

$$M = \frac{2L}{L+rcR}$$

Hence calculate the value of L when M = 1/2., r = 3, c = 4 and R = 5 (7 marks)

b) Solve the following equations

i) $\frac{5-x}{4} = \frac{x}{5} + \frac{7}{20}$

ii) $8x - 3y = 39$

$7x + 5y = -4$ (9 marks)

c) Simplify i) $\frac{(2^{3})^{4} \times (3^{2})^{2}}{16^{2} \times 9^{3}}$

ii) log 125 + log 25 – log 625 (6 marks)

d) Convert 157 to binary (2 marks)

e) Use logarithms to evaluate

$$\sqrt{\frac{820 \times 6.24}{11.23^2}}$$ 6 marks)

QUESTION TWO (20 MARKS)

a) Evaluate : i) $32^{3/2} \times 8^{-1/2} \times \frac{1}{\sqrt{64}}$

ii) $\log_{1.2} 17.28$ (6 marks)

b) Solve the following equations:

i) $x^2 + 15x + 50 = 0$

ii) $3^{x+1} = 2^{2x-3}$ correct to 2 dp. (9 marks)

c) If the equation ax +by = 4 is satisfied by the values of x = 3 and y = 1 and also by the values x= -2 and y=-2, find the value of a and b. hence find the value of y when x = 8 (5 marks)

QUESTION THREE (20 MARKS)

a) Solve for x ; $1 - \log (x-6) = \log x$ (6 marks)

b) Convert i) 1046.24_8 to denary

ii) 465_{ten} into duo decimal (5 marks)

c) Add 243_7 to 26_7, and multiply the result by 35_7 (5 marks)

d) if $7^{2y} = 560.6$, find y (4 marks)

QUESTION FOUR (20 MARKS)

a) The age of the father is three times that of his son, the sum of their ages is 72. What are their ages? (5 marks)

b) The perimeter of a rectangular plot is 76m. The area is 360 m^2. Calculate the length and the breadth of the rectangle. (7 marks)

c) i Express as a single logarithm $3 \log 2 + 2 \log 3 - 2 \log 6$

ii Express in logarithmic notation $a = b^c$

iii Express in index notation $2 = \log_a x$ (5 marks)

d) Convert $11011011_{\ 2}$ to octal (3 marks)

QUESTION FIVE (20 MARKS)

a) Find the value of $\frac{18^0 \times 16^{1/4}}{8} + 32^{-0.4}$ (3 marks)

b) Solve the following simultaneous equations by graph method $x + y = 3$ and $3x - y = 5$ (5 marks)

c) Draw the graph of $y = 2 + 5x - x^2$ for values of x from -3 to 7 hence use the graph to find the roots of the following equations

$2 + 5x - x^2 = 0$

$3 + x - x^2 = 0$ (12 marks)