



MACHAKOS UNIVERSITY

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF MATHEMATICS AND STATISTICS

FIRST SECOND SEMESTER EXAMINATION FOR CERTIFICATE IN B.C.E AND PLUMBING.

MATHEMATICS I

Instructions

Answer all the questions

show your working clearly.

Question one

a) Solve the following equations (16 marks)

i) $2^{2x-3} = 4^{x+3}$

ii) $\frac{4^{2x} \times 8^x}{2^x} = 64$

iii) $\log(x+6) - \log(x-3) = 1$

iv) $2x - 3y = 7$

$$4x + 3y = 5$$

b) Determine the LCM of 36, 45 and 60 (4 marks)

Question two

a) Evaluate,

i) $\log 96 + 3 \log 5 - \log 12$

ii) $\frac{1}{2} \left\{ \frac{3}{5} + \frac{1}{4} \left(\frac{7}{3} - \frac{3}{7} \right) \right\}$ of $1\frac{1}{2} \div 5$ (10 marks)

b) Make l the subject of the formula

$$\frac{2l}{l + rcR} = m$$

Hence calculate the value of l when $m = \frac{1}{2}$, $r = 3$, $c = 4$, $R = 5$

- c) Express 3.280843 m in
- Cm
 - Km
 - Correct to 2 s.f. (3marks)

Question three

- a) The fourth term of an A.P is 14 and the sum of the first six terms is 69. Determine the:
- First term
 - Common difference
 - Sum of the first sixteen terms. (9marks)
- b) If the median of the numbers 25, x, 16, 12, 24 and 14 is 18, find x.
- c) The table below shows the number of goals scored by a team in 15 matches.

score	0	1	2	3	4	5	6
frequency	1	0	3	2	5	3	1

Determine

- The mean
- The mode
- The median

Question four

- a) Solve the following equations
- $x^2 + 15x + 50 = 0$
 - $3^{x+1} = 2^{2x-3}$ correct to 2 decimal place
- b) John borrowed sh 75,000 for two years. The rate of simple interest for the first year was 9.75%, but for the second year the rate increased to 11%. How much more interest he paid in the second year than in the first year (5 marks)

Simplify

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

ii) $\log_e 3$

Question five

- a) Express the first quantity as a fraction of the second quantity (6marks)
- 45 seconds: 1 hour
 - 450g: 2kg
- b) Express 0.18 as a fraction (3marks)

- c) Draw the graph of $y = -x^2 + 5x + 2$ for values of x from -3 to 7; hence use the graph to solve the following equations (11 marks)

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

$$3 + x - x^2 = 0$$

