



TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF ELECTRICAL & ELECTRONIC ENGINEERING

UNIVERSITY EXAMINATION FOR:

CERTIFICATE IN TECHNOLOGY ELECTRICAL AND ELECTRONIC ENGINEERING

AMA 1150 : ENGINEERING MATHEMATICS I

END OF SEMESTER EXAMINATION

SERIES : AUGUST 2019

TIME: 2 HOURS

Instructions to Candidates

You should have the following for this examination

-Answer Booklet, examination pass and student ID

This paper consists of FIVE questions. Attempt question ONE and any other TWO Questions

Do not write on the question paper.

Question ONE:

(a) Determine the value of:

i) $4\frac{5}{8} - 3\frac{1}{4} + 1\frac{2}{5}$ (4marks) .

ii) Evaluate:

$1\frac{3}{5} \times 2\frac{1}{3} \times 3\frac{3}{7}$ (4marks)

iii It takes 21 hours for 12men to resurface a stretch of road. Find how many men it takes to resurface a similar stretch of road in 50hours 24 minutes assuming the work rate remains constant.

(4 marks)

(b) Use elimination method to solve the simultaneous equations

$$3x+4y = 5$$

$$2x-5y = -12$$

(4 marks)

(c) Find the volume and total surface area of a cylinder of length 15cm and diameter 8cm.

d

) If you deposit \$6500 into an account paying 8% annual interest compounded monthly, how much money will be in the account after 7 years? **(6 marks)**

QUESTION TWO:

i) Given the two equations, determine the values of a and b.

$$\frac{1}{2a} + \frac{3}{5b} = 4 \quad (1)$$

$$\frac{4}{a} + \frac{1}{2b} = 10.5$$

(6 marks)

ii) A copper wire has a length l of 1.5 km, a resistance R of 5 and a resistivity of 17.2×10^{-6} mm. Find the cross-sectional area, a, of the wire, given that $R = \rho l/a$

(5 marks)

iii) The law connecting friction F and load L for an experiment is of the form $F = aL + b$, where a and b are constants. When $F = 5.6$, $L = 8.0$ and when $F = 4.4$, $L = 2.0$. Find the values of a and b and the value of F when $L = 6.5$

(5 marks)

vii) Simplify $\log 64 - \log 128 + \log 32$

(5 marks)

QUESTION THREE:

a) Some approximate imperial to metric conversions are shown in Table 4.2

Table 4.2

length 1 inch = 2.54 cm

1 mile = 1.61 km

weight 2.2 lb = 1 kg

(1 lb = 16 oz)

capacity 1.76 pints = 1 litre

(8 pints = 1 gallon)

Use the table to determine:

- (a) the number of millimetres in 9.5 inches,
- (b) a speed of 50 miles per hour in kilometres per hour,
- (c) the number of miles in 300 km,
- (d) the number of kilograms in 30 pounds weight,
- (e) the number of pounds and ounces in 42 kilograms (correct to the nearest ounce),
- (f) the number of litres in 15 gallons, and

(g) the number of gallons in 40 litres.

(14marks)

b) A rectangular tray is 820 mm long and 400 mm wide.

Find its area in (a) cm²

(6 marks)

QUESTION FOUR:

a) Express in standard form, correct to 3 significant figures:

ii) $\frac{3}{8}$

iii) $19\frac{2}{3}$

iv) $741\frac{9}{16}$

(6 marks)

b) Evaluate:

(i) $\text{Log } 10^{10}$

(ii) $\text{Log } 16^8$

(4marks)

c) i) Simplify $(3c + 2c) 4c + c \div 5c - 8c$

ii) Simplify $(2a - 3) \div 4a + 5 \times 6 - 3a$

(5 marks)

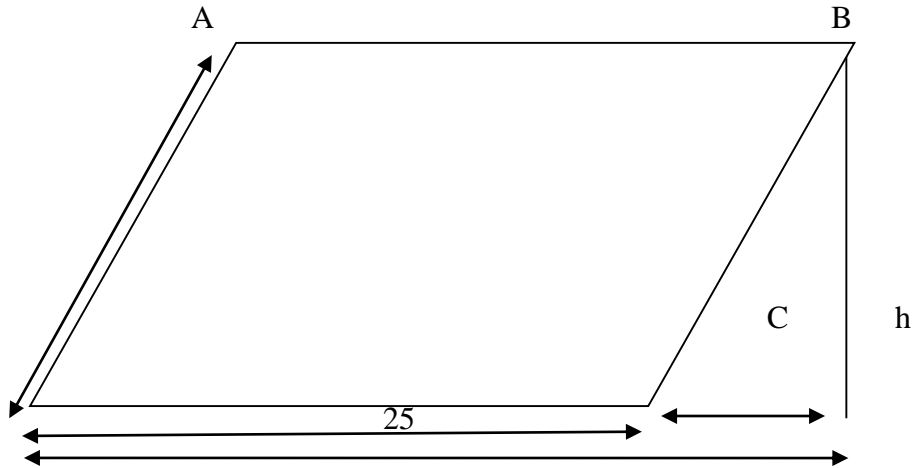
d) Find the value of $23 - 4(2 \times 7) + \frac{(144 \div 4)}{(14 - 8)}$

(3 marks)

QUESTION FIVE:

i) Find the area of the parallelogram shown in Fig. 22.8 (dimensions are in mm). A D C E

(6 marks)



ii) Solve the equations,

i) $x^2 + 4 = 0$

ii) $2x^2 + 3x + 5 = 0$

(4 marks)

iii) Find the value of:

$$2^3 \times \frac{2^4}{\quad}$$

$$2^7 \times 2^5$$

(5 marks)