



MACHAKOS UNIVERSITY

University Examinations 2020/2021 Academic Year

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF MATHEMATICS AND STATISTICS

FIRST YEAR FIRST TERM EXAMINATION FOR

DIPLOMA IN BUILDING AND CIVIL

MECHANICAL ENGINEERING

AUTOMOTIVE ENGINEERING

2501/103M: ENGINEERING MATHEMATICS 1

2502/103M: ENGINEERING MATHEMATICS 1

2503/103M: ENGINEERING MATHEMATICS 1

2705/102M: ENGINEERING MATHEMATICS 1

2707/102M: ENGINEERING MATHEMATICS 1

DATE: 4/6/2021

TIME: 11.30-2.30 PM

INSTRUCTIONS:

Answer **ALL** questions

Each question carries **20** marks

QUESTION ONE 20 MARKS

- a) Convert $4.3\bar{6}$ to a mixed fraction (2 marks)
- b) Evaluate the L.C.M and H.C.F of the following set of numbers
i) 12, 16, 24 ii) 36, 56, 84 (2 marks)
- c) Change 6.345 hours into hours, minutes and seconds (3 marks)
- d) simplify
- i. $1\frac{1}{3} + 4\frac{4}{5} - \frac{2}{9} - 1\frac{1}{5}$ (4 marks)
- ii. $\frac{7}{15}$ of $(15 \times \frac{5}{7}) + (\frac{3}{4} \div \frac{15}{16})$ (6 marks)
- iii. $(16x^2y^{-4})^{-1}$ (3 marks)

QUESTION TWO (20 MARKS)

- a) Without using tables or calculator evaluate

$$\frac{0.325 + 1.2 + 4}{0.125 \times 8 + 0.25}$$

(3 marks)

- b) Obtain the square root of the following using factor method

i) 441

ii) 1296

iii) 2304

(3 marks)

- c) A biscuit producing company packs biscuits in packets of 18, 48 or 60 biscuits each. What is the smallest number of biscuits that can be packed in any of these quantities without any biscuit being left over?

(3 marks)

- d) Simplify

$$\frac{x^{-3}y^{\frac{1}{2}} \times x^{\frac{1}{2}}y^{-2}}{x^{-6}y^{\frac{1}{2}}}$$

(4 marks)

- e) Solve
- $0.0967 \times 23.4 \times 0.798$

(5 marks)

- f) Evaluate
- $\frac{\frac{1}{2} + 2\frac{1}{7} + \frac{2}{7} \text{ of } 3\frac{2}{3}}{\frac{8}{4} \times (2\frac{1}{7} - \frac{1}{6})}$

(5 marks)

QUESTION THREE (20 MARKS)

- a) i) solve for
- x
- $\log x = 0.9876$

(3 marks)

- ii) Evaluate
- $\frac{0.945 \times 45.6}{256 \times 0.0087}$

(8 marks)

- b) Given that
- $\log_{10} 2.2^2 = 0.3424$
- and
- $\log_{10} 5.5 = 0.7404$

Determine without using tables

i) $\log_{10} 22^2$

ii) $\log_{10} 220\sqrt{5.5}$

(4 marks)

- c) Solve for x in the equation

$$\frac{x+3}{5} = \frac{2x-3}{6}$$

(5 marks)

QUESTION FOUR (20 MARKS)

a) Use logarithm tables to evaluate

$$\text{i.} \quad \frac{5.69 \times 17.8}{10.67} \quad (4 \text{ marks})$$

$$\text{ii.} \quad 0.0024 \div 23.56 \times 0.934 \quad (6 \text{ marks})$$

b) Simplify without using tables

$$\text{i)} \quad \log 120 + \frac{1}{3} \log 27 - 2 \log 6 \quad (3 \text{ marks})$$

$$\text{ii)} \quad \frac{\log 25 - \log 125 + \frac{1}{2} \log 625}{3 \log 5} \quad (3 \text{ marks})$$

c) Solve the equations

$$\log(3x - 1) = \log(2x + 1) - \log 4 \quad (4 \text{ marks})$$

QUESTION FIVE (20 MARKS)

a) simplify

$$\text{i.} \quad \frac{\log 25 - \log 125 + \frac{1}{2} \log 625}{3 \log 5} \quad (6 \text{ marks})$$

$$\text{ii.} \quad 2\frac{7}{16} - 3\frac{1}{5} + 1\frac{5}{8} \quad (4 \text{ marks})$$

b) Evaluate

$$\frac{\log_x 32 - \log_x 4 + \log_x 8}{\log_x 25} \quad (6 \text{ marks})$$

c) Given $\log 2 = 0.3010$ and $\log 3 = 0.4771$ evaluate

$$\text{i)} \quad \log 96$$

$$\text{ii)} \quad \log 216 \quad (4 \text{ marks})$$