MURANG'A UNIVERSITY OF TECHNOLOGY

SCHOOL OF ENGINEERING AND TECHNOLOGY

UNIVERSITY ORDINARY EXAMINATION

2021/2022 ACADEMIC YEAR

THIRD YEAR **FIRST** SEMESTER EXAMINATION FOR BACHELOR OF TECHNOLOGY IN MECHANICAL ENGINEERING

EMT307– METROLOGY

DURATION: 2 HOURS

INSTRUCTIONS TO CANDIDATES:

1. Answer question One and Any Other Two questions.
2. Mobile phones are not allowed in the examination room.
3. You are not allowed to write on this examination question paper.

QUESTION ONE (30 MARKS)

a) Differentiate the following terms
   i. Precision and accuracy.
   ii. Tolerance and Error.
   iii. End standards and Line standards.
   iv. Systematic errors and Random errors.
   v. Imperial system and Metric system. (10 mks)

b) Define methodology and state its branches. (3 mks)

c) State five basic elements of a measuring system. (5 mks)

d) Explain the use of dial indicators as linear measuring instrument. (7 mks)

e) Outline the basic principles of an optical pyrometer. (5 mks)

QUESTION TWO (20 MARKS)

a) State any four characteristics of measuring instruments. (4 mks)

b) Explain in detail the following methods of measurements. (16 mks)
   i. Direct method and indirect method
   ii. Comparison method
   iii. Substitution methods
   iv. Differential methods
   v. Transposition methods
   vi. Coincidence method
   vii. Null Method
   viii. Interpolation methods

QUESTION THREE (20 MARKS)

a) Sketch a well labelled diagram of a vernier instrument. (5mks)

b) Explain the function of parts of a vernier instrument in (a) above. (5 mks)

c) Draw a well labelled diagram of a micrometre and explain the function of tis parts. (10 mks)

QUESTION FOUR (20 MARKS)

a) Draw a well labelled diagram of a gear tooth and explain the function of its parts. (10 mks)

b) Highlight the principles of operation of autocollimator.
   NB: Use a well labelled diagram. (10 mks)