

MACHAKOS UNIVERSITY
University Examinations 2019/2020
SCHOOL OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF MECHANICAL AND MANUFACTURING ENGINEERING
SECOND YEAR SECOND SEMESTER EXAMINATION FOR
DIPLOMA IN MECHANICAL ENGINEERING
MED-PR 213: METROLOGY AND MEASURING INSTRUMENTS II

Date:

Time: 2 hours

Instructions.

- **Answer Question 1 (Compulsory) and any other TWO questions.**

- 1.(a) Describe TWO types of engineering metrology. (6 marks)
- (b) State FIVE purposes of engineering metrology. (10 marks)
- (c) Describe the term “ interchangeable manufacturing”. (4 marks)
- (d) Outline FOUR advantages of wavelength standards. (8 marks)
- (e) Give TWO relative characteristics of line standards and end standards. (2 marks)
2. (a) Define the following terms with reference to limits and fits in engineering.
- (i) Shaft,
- (ii) Hole,
- (iii) Zero line.
- (6 marks)
- (b) Using a sketch, indicate the following elements of a fit.
- (i) Maximum limit of size,
- (ii) Minimum limit of size,
- (iii) Tolerance,
- (iv) Maximum clearance and
- (v) Minimum clearance.
- (7 marks)

(c) Explain the following systems of fit with the aid of a sketch:

(i) Hole basis,

(ii) Shaft basis.

(7marks)

3.(a) Differentiate between precision and accuracy with reference to measuring instruments. (4 marks)

(b) Outline FOUR desirable features of a comparators. (8 marks)

(c) Explain the Taylors principle of gauging. (8 marks)

4.(a) Outline THREE essential parts of any comparator. (6 marks)

(b) State THREE uses of comparators in engineering. (6 marks)

(c) With the aid of a sketch, explain the working of the Johansson Mikrokator. (8 marks)

5(a) Define the term “ surface texture” with reference to machining. (4 marks)

(b) Describe FOUR classes of surface texture irregularities. (8 marks)

(c) Explain the following methods of surface finish assessments:

(i) Microscopic inspection;

(ii) Micro interferometry.

(8 marks)