



# MACHAKOS UNIVERSITY

University Examinations 2018/2019

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: 6/5/2019

TIME: 8.30-10.30 AM

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## INSTRUCTIONS:

**Answer Question One (Compulsory) and Any Other Two Questions**

### QUESTION ONE (30 MARKS)

- 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)

### QUESTION TWO (20 MARKS)

- 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. (7 marks)

### **QUESTION THREE (20 MARKS)**

- 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)

### **QUESTION FOUR (20 MARKS)**

- 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)

### **QUESTION FIVE (20 MARKS)**

- 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)