



MACHAKOS UNIVERSITY

University Examinations April 2019 series

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF MECHANICAL AND MANUFACTURING ENGINEERING

**FIRST YEAR SECOND TERM ONE EXAMINATION FOR CRAFT CERTIFICATE IN
MECHANICAL ENGINEERING (PRODUCTION OPTION)**

MATERIALS SCIENCE AND METALLURGY

Instructions to students

- attempt all questions in this exam.

1. With the aid of a labelled diagram describe the production of steel by use of electric furnace. (20 Marks)
2. (a) Explain the purpose of each of the following elements in their respective steels.
 - (i) Nickel
 - (ii) Chromium
 - (iii) Tungsten
 - (iv) Vanadium
 - (v) Manganese (15Marks)

(b) State FIVE common properties with non-ferrous metals and alloys (5Marks)
3. (a) State EIGHT properties of bearing materials. (8marks)

(b) Differentiate between thermosetting and thermoplastics plastics. (6marks)

(c) State six types of rubber (6marks)
4. (a) Explain FOUR benefits of stainless steel (8marks)

(b) Explain FOUR reasons for curing timber. (8 marks)

- (c) State FOUR methods of seasoning timber (4 marks)
5. (a) Explain any FIVE methods for corrosion prevention (10marks)
- (b) Describe each of the following heat treatment processes.
- (i) Hardening
 - (ii) Annealing (10marks)