



MACHAKOS UNIVERSITY

University Examinations 2018/2019

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF MECHANICAL AND MANUFACTURING ENGINEERING

FIRST YEAR SECOND SEMESTER EXAMINATION FOR

CRAFT CERTIFICATE IN MECHANICAL ENGINEERING (PRODUCTION OPTION)

1501/105B: MATERIAL SCIENCE AND METALLURGY

DATE: 17/04/2019

TIME: 8.30-11.30 AM

INSTRUCTIONS:

Answer all questions in this exam.

QUESTION ONE (20 MARKS)

With the aid of a labelled diagram describe the production of steel by use of electric furnace.

QUESTION TWO (20 MARKS)

- a) Explain the purpose of each of the following elements in their respective steels.
- Nickel
 - Chromium
 - Tungsten
 - Vanadium
 - Manganese (15 marks)
- b) State FIVE common properties with non-ferrous metals and alloys (5 marks)

QUESTION THREE (20 MARKS)

- a) State EIGHT properties of bearing materials. (8 marks)
- b) Differentiate between thermosetting and thermoplastics plastics. (6 marks)
- c) State six types of rubber (6 marks)

QUESTION FOUR (20 MARKS)

- a) Explain FOUR benefits of stainless steel (8 marks)
- b) Explain FOUR reasons for curing timber. (8 marks)
- c) State FOUR methods of seasoning timber (4 marks)

QUESTION FIVE (20 MARKS)

- a) Explain any FIVE methods for corrosion prevention (10 marks)
- b) Describe each of the following heat treatment processes.
- Hardening
 - Annealing (10 marks)