



Machakos University

(University Examinations 2018/2019)

SCHOOL OF ENGINEERING

DEPARTMENT OF MECHANICAL AND MANUFACTURING ENGINEERING

**SECOND SEMESTER EXAMINATION FOR DIPLOMA (II) IN MECHANICAL
ENGINEERING**

UNIT CODE: MED-PR 2502/106 MATERIALS AND METALLURGY 1

DATE:

TIME: 2HRS

INSTRUCTIONS

Answer all questions

1. a) With the aid of a sketch, explain the structural changes that occur when austenitic stainless steels are heated through a temperature range from (650⁰c-800⁰c) giving two methods of minimizing the defect. (12mks)
- b) State two properties of each of the following
 - i. Heat resisting steels
 - ii. Free cutting steels (4mks)
- c) State two uses of high speed steels (2mks)
2. a) Aluminium oxide is extracted from bauxite by the Bayer process. Explain the Bayer process. (12mks)
- b) List any two aluminium alloys stating two properties and two uses of each. (8mks)
3. a) State and explain the two broad classifications of plastics. (10mks)
- b) List five ways in which plastics are superior to metals in engineering (5mks)

- c) State the use of each of the following plastics
- i. Polyvinylchloride.
 - ii. Phenol formaldehyde. (4mks)
- d) Give one example of crystalline plastics. (1mk)
4. a) State any four characteristics of good timber. (4mks)
- b) Differentiate between exogenous and endogenous tress. (2mks)
 - c) Define 'seasoning' in reference to timber. (2mks)
 - d) List four advantages of timber seasoning. (4mks)
 - e) Describe the following methods of timber seasoning;
 - i. Air seasoning.
 - ii. Kiln seasoning. (6mks)
- 5 a). State any four properties of stainless steels which make them have numerous applications in the industry (4mks)
- b). State the three classes of stainless steels with regard to composition giving two properties and two applications of each. (12mks)
 - c). Give an account for the high corrosion resistance offered by stainless (4mks)