



MACHAKOS UNIVERSITY

University Examinations 2016/2017

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF MECHANICAL AND MANUFACTURING ENGINEERING

FIRST YEAR SECOND SEMESTER EXAMINATION FOR DEGREE IN

BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING

EMM 107: ENGINEERING MATERIALS

DATE: 19/6/2017

TIME: 8:30 – 10:30 AM

INSTRUCTIONS

Attempt Question One (Compulsory) And Any Other TWO Questions

- 1
 - a) Discuss the production process of Iron from its ores (10 marks)
 - b) Pure iron is unsuitable for most engineering applications. Explain in details the Bessemer process of manufacturing steel. (10 marks)
 - c) With the aid of suitable a sketch, discuss the effect of increasing the carbon content on the following properties of steel:
 - i. Tensile strength
 - ii. Brinnell Hardness (10 marks)
2.
 - a)
 - i. What are plain carbon steels
 - ii. Describe three types of plain carbon steels, giving an application for each. (10 marks)
 - b)
 - i. Identify three alloying elements and highlight their effect on the resulting steel. (6 marks)
 - ii. Discuss two types of alloy steels and give an application for each. (4 marks)

3. a) Describe in details the process of production of Aluminium from its bauxite ore (9 marks)
- b) Outline the purification process of impure aluminium (5 marks)
- c) i. Define the term metal corrosion and highlight its economic effects
- ii. Discuss two metallic methods of corrosion control (6 marks)
4. Plastics are increasingly finding their way in almost all engineering fields.
- a) Explain three advantages of plastics over other Engineering materials (8 marks)
- b) With the aid of suitable sketches explain the following plastic moulding techniques
- i. Compression moulding
- ii. Injection moulding (8 marks)
- c) Identify two additives included in a plastic material and state their functions (4 marks)
5. a) Discuss the following types of composite materials
- i. Agglomerated composites
- ii. Reinforced composites
- iii. Laminated composites (9 marks)
- b) i. Explain the process of manufacturing glass from its constituents
- ii. Describe the functions of three constituents of glass
- iii. State three requirements that natural glass must meet (11 marks)