



TECHNICAL UNIVERSITY OF MOMBASA

DEPARTMENT OF MECHANICAL AND AUTOMOTIVE ENGINEERING

UNIVERSITY EXAMINATION

FOR

DIPLOMA IN MECHANICAL ENGINEERING

EME 1131: MATERIALS AND PROCESSES

END OF SEMESTER EXAMINATION

SERIES: APRIL

TIME: 2HOURS

DATE: APRIL 2016

Instructions to Candidates

You should have the following for this examination

-Answer Booklet, examination pass and student ID

This paper consists of five questions. Attempt any THREE questions.

Do not write on the question paper.

QUESTION ONE

- a) i. Differentiate between the **four** main groupings of engineering materials.
- b) ii. State any two materials for each of the main groupings given in (ai) above. **(12marks)**
- c) Differentiate between “ferrous” and nonferrous metals **(4marks)**
- d) Differentiate between “thermosets” and Elastomoss giving. ONE example of each plastic. **(4marks)**

QUESTION TWO

- a) i. Describe **four** main construction features of the glass furnace

ii. Discuss any **four** common available iron ores giving their approximate composition. **(8marks)**

b) i. Explain **FOUR** main charging materials commonly added into furnaces and their functions.

ii. Outline the **three** main ferrous metals refined from pig iron **(7marks)**

c) i. Define cast iron

ii. Differentiate clearly between the **two** types of cast irons **(5marks)**

QUESTION THREE

a) i. Define the term alloy

ii. State any **EIGHT** commonly added alloying elements to steels **(6marks)**

b) i. clearly describe the production process of aluminum by the electrolysis process.

ii. State three main properties and three applications of such an aluminium **(10marks)**

c) State any four specific applications common to all non ferrous metals. **(4marks)**

QUESTION FOUR

a) i. Define metal forming and state any **four** hand forming processes.

ii. Differentiate “cold working” and “hot” working **(8marks)**

b) Describe the purpose of heat treatment processes. **(6marks)**

c) i. Define the term BI metals or sandwich

ii. With a neat labeled sketch illustrate the typical construction of a thermocouple **(6marks)**

QUESTION FIVE

a) i. Explain the purpose of materials testing

ii. Differentiate clearly between the **two** main methods of materials testing. **(6marks)**

b) With the aid of a suitable sketch describe the tensile testing procedure. **(6marks)**

c) i. Describe corrosion and state the **three** major factors that govern corrosion.

ii. State and describe any **three** causes of corrosion

(8marks)