TECHNICAL UNIVERSITY OF MOMBASA

Faculty of Engineering and Technology
Department of Electrical & Electronics engineering
UNIVERSITY EXAMINATION FOR:
Certificate in Electrical & Electronics Engineering
EME 1131 : Materials & Processes
SPECIAL/ SUPPLEMENTARY EXAMINATION
SERIES: AUGUST 2019
TIME: 2 HOURS
DATE: Pick Date **Aug 2019**

Instruction to Candidates:

You should have the following for this examination

- *Student I.D. Card & Examination Pass*
- *Answer booklet*
- *Non-Programmable scientific calculator*

This paper consists of **FIVE** questions. Attempt question **ONE** and any other **TWO** questions.

Maximum marks for each part of a question are as shown.

Do not write on the question paper.

Question ONE

a) Distinguish between Ferrous and Non-Ferrous Materials giving two examples of each. **(8 marks)**

b) Name three types of Cast Iron. **(3 marks)**

c) Give two applications or each of the Cast Irons in (b) above. **(6 marks)**

d) Give four applications of Medium Carbon Steel. **(4 marks)**

e) In the Production of High Carbon Steel, what kind of Furnace is used? **(5 marks)**

f) Explain the meaning of the following terms: **(4 marks)**

i. Annealing

ii. Normalizing

Question TWO

a) With the aid of diagrams describe how Mild Steel is Produced using the Bessemer converter. **(6 marks)**

b) Describe the three types of Mild Steel. **(6 marks)**

c) Define the following Properties, giving one example in each case: **(8 marks)**

i. Toughness
ii. Ductility
iii. Brittleness
iv. Malleability

Question THREE

a) Define the term 'Tensile load' **(2 marks)**

b) Sketch a graph of Stress against Strain for a ductile material undergoing a Tensile Test. **(6 marks)**

c) Label the points of the Stress/Strain graph in (b) above. **(4 marks)**

d) State the Importance of the Points Labeled in (c) above. **(3 marks)**

e) With the aid of diagrams, describe the Heat Treatment of Plain Carbon Steels. **(5 marks)**

Question FOUR

a) Define the following terms: **(6 marks)**

i. Forging
ii. Drifting
iii. Swaging
iv. Punching
v. Fullering
vi. Flattering

b) Make neat sketches of the hand forging tools used in (a) above. **(12 marks)**

c) Explain the difference between upsetting and flattening. **(2 marks)**

Question FIVE

a) Define the terms: **(6 marks)**

i. Conductor
ii. Semi-conductor
iii. Insulator

b) Give two examples each of materials which fall under (a) above. **(6 marks)**

c) Distinguish between thermoplastics and thermosetting Plastics giving three examples in each case. **(4 marks)**

d) Briefly outline the role played by plastics in the Electronics Industry. **(4 marks)**