



MURANG'A UNIVERSITY OF TECHNOLOGY

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

UNIVERSITY ORDINARY EXAMINATION

2018/2019 ACADEMIC YEAR

**FIRST YEAR SECOND SEMESTER EXAMINATION FOR, DIPLOMA IN
ELECTRICAL & ELECTRONICS ENGINEERING**

EEE 056 – MATERIALS AND PROCESSES

DURATION: 2 HOURS

DATE: 20/12/2018

TIME: 2 -4 P.M.

Instructions to candidates:

1. Answer question One and Any Other Two questions.
2. Mobile phones are not allowed in the examination room.
3. You are not allowed to write on this examination question paper.

SECTION A: ANSWER ALL QUESTIONS IN THIS SECTION

QUESTION ONE (30 MARKS)

- a. The Occupational Safety and Health Act No. 15 of 2007 provides for the Safety, Health and Welfare of workers in workplaces. According to this Act;
- i. List any FOUR general duties of occupiers. (4 Marks)
 - ii. List any THREE duties of an employee (3 Marks)
- b. List any FIVE categories of Personal Protective Equipment and give ONE example of each (5 Marks)
- c. Differentiate between physical and mechanical properties of engineering materials. Give TWO examples of each kind. (3 Marks)
- d. Explain THREE major hazards arising from the use of electrical equipment (3 Marks)
- e. Describe the appearance, contents and the appropriate application of any TWO portable fire extinguishers (6 Marks)
- f. Name the THREE heads which comprise a combination set and describe the use of each one (6 Marks)

SECTION B – ANSWER ANY TWO QUESTIONS IN THIS SECTION

QUESTION TWO (20 MARKS)

- a. Distinguish between ferrous and non-ferrous metals (2 Marks)
- b. Name and explain:
- i. Any TWO physical properties of materials (3 Marks)
 - ii. Any TWO mechanical properties of materials (3 Marks)
- c.
- i. Define the term “heat treatment” (2 Marks)
 - ii. Describe in detail the following processes, stating the purpose of each and the effect of the process on the material microstructure
 - Annealing
 - Normalizing (6 Marks)
 - iii. Describe the process of hardening a piece of high carbon steel (4 Marks)

QUESTION THREE (20 MARKS)

- a. Name the two main purposes of marking out (2 Marks)
- b. Describe the following equipment used in marking out. Mention the materials from which they are made and include a simple sketch of the equipment in use.
- Surface table
 - Vee block
 - Hermaphrodite calipers (9 Marks)
- c. Name the THREE standard grades of cut of a file (3 Marks)
- d. Name and describe THREE types of hacksaw blades available (3 Marks)
- e. Explain why it is essential to use correct size of screwdriver (1 Mark)
- f. Explain why is it necessary to keep cutting edge cool when regrinding a cold chisel (2 Marks)

QUESTION FOUR (20 MARKS)

- a.
- i. Name the THREE principal parts of a twist drill (3 Marks)
 - ii. Explain any FOUR types of operations carried out on a centre lathe (6 Marks)
 - iii. Name any TWO advantages and TWO disadvantages of welding (4 Marks)
- b.
- i. Name any FOUR types of mechanical fasteners that are used for joining parts together (2 Marks)
 - ii. State the composition of soft solders (1 Mark)
 - iii. Explain the need for the use of flux during brazing or soldering (2 Marks)
 - iv. Name any adhesive used to establish a permanent bond between two joint surfaces (2 Marks)