



TECHNICAL UNIVERSITY OF MOMBASA

Faculty of Engineering and Technology
Department of Mechanical & Automotive Engineering
UNIVERSITY EXAMINATION FOR:
Diploma in Mechanical Engineering
APS 2150: Physical Science for Engineers
END OF SEMESTER EXAMINATION
SERIES: AUGUST 2019
TIME: 2 HOURS
DATE:

Instruction to Candidates:

You should have the following for this examination

- *Answer booklet*

This paper consists of **FIVE** questions. Attempt any **THREE** questions.

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

Do not write on the question paper.

Question ONE

- a) State any **SIX** similar properties of sound and light waves. (6 marks)
- b) Using sketches, explain how the eye can see objects. (6 marks)
- c) Explain any **FOUR** laws of optics and state an application for each law. (8 marks)

Question TWO

- a) Explain the **THREE** modes of heat transfer giving an example for each. (6 marks)
- b) Using a change of state graph, show the change of state of water from -10°C to 300°C showing all the important temperature points, states and latent heats. (10 marks)
- c) State any **FOUR** heat transfer laws giving an application for each. (4 marks)

Question THREE

- a) Explain the term *Thermodynamics* and explain its first law. (4 marks)
- b) State any **SIX** properties of an ideal gas or fluid. (6 marks)
- c) State any **FIVE** thermodynamic fluids used in engineering applications. (5 marks)
- d) State any **SIX** applications of thermodynamics in engineering applications. (6 marks)

Question FOUR

- a) Explain any FIVE organic compounds stating an application for each. **(10 marks)**
- b) Explain the term "Thermo-chemistry" and define the principle of electrolysis stating two applications. **(10 marks)**

Question FIVE

- a) Explain how the periodic table of elements is arranged in terms of reactivity, physical and chemical properties. **(10 marks)**
- b) Explain any THREE types of bonding of elements. **(6 marks)**
- c) Define the following terms giving an example for each; **(4 marks)**
- i. Mixture
 - ii. Element
 - iii. Compound
 - iv. Molecule