**TECHNICAL UNIVERSITY OF MOMBASA**

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**Faculty of Engineering and Technology**
**Department of Mechanical & Automotive Engineering**
**UNIVERSITY EXAMINATION FOR:**
**Diploma in Mechanical Engineering**
**APS 2150: Physical Science for Engineers**
**SPECIAL/ SUPPLEMENTARY 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.**

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**Question ONE**

a) State any SIX contrasting properties of sound and light waves. **(6 marks)**
b) Using sketches, explain how the Telescope works. **(6 marks)**
c) Explain any FOUR laws of optics and state an application for each law. **(8 marks)**

**Question TWO**

a) Explain any THREE methods of measuring temperature stating an application for each. **(6 marks)**
b) Using a change of state graph, show the change of state of Ammonia from -10 ˚C to 100 ˚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 Three laws of Thermodynamics. **(3 marks)**
b) Define an ideal gas or fluid and state any of its four properties. **(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 the term "organic compound" and state any of its FIVE properties. **(8 marks)**

b) Define any THREE types of bonding in organic compounds. **(6 marks)**

c) Explain the following terminologies;

i. Compound
ii. Mixture
iii. Emulsion
iv. Element
v. Molecule
vi. Substance

**(6 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 FOUR types of bonding of elements. **(6 marks)**

c) Define the arrangement of electrons in different energy fields in an atom. **(4 marks)**