

BOWEN UNIVERSITY, IWO. OSUN STATE. NIGERIA
COLLEGE OF AGRICULTURE, ENGINEERING, AND SCIENCES
PHYSICS PROGRAMME

FIRST EXAMINATION 2022/2023 SESSION

PHY 203: GENERAL PHYSICS III (3CREDITS)

DATE: 13th, FEBRUARY 2023

TIME: 8.30am – 11.30am

INSTRUCTION: ANSWER ANY THREE (3) QUESTIONS

QUESTION 1

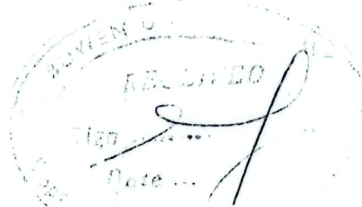
- a) (i) What is thermal energy? [3MARKS]
(ii) State the law of thermodynamics that relates work and heat transfer. [3MARKS]
- b) (i) Define an isochoric process? [3MARKS]
(ii) Briefly explain work in an ideal gas process. [4MARKS]
- c) (i) List 3 types of heat transfer. [3MARKS]
(ii) Hence define each one briefly. [9MARKS]

QUESTION 2

- a) State the third law of thermodynamics according to :
(i) Gibbs-Helhotz
(ii) Nerst
(iii) Planck [9MARKS]
- b) List five (5) applications of the third law of thermodynamics. [5MARKS]
- c) (i) List three (3) parameters discovered apart from the parameter of thermal expansion [6MARKS]
(ii) Explain **one** of the three parameters listed in c (i) above. [5MARKS]

QUESTION 3

- a) Consider two (2) empty glasses. Hot water is poured into one and cold water into the other. After a short period of time, the temperatures of the hot glass of water, cold glass of water and the surroundings became the same.
- (i) On what principle is the above scenario based [3MARKS]
(ii) What thermodynamic law emphasizes this principle in (i) above. [3MARKS]
(iii) State the thermodynamic law. [3MARKS]
(iv) State a common application of the law. [3MARKS]



- b) List four (4) types of thermometers. [4MARKS]
c) In a **tabular form**, list the thermometric property of the thermometers mentioned in (b) above. [9MARKS]

QUESTION 4

- a) (i) What is an ideal gas engine? [3MARKS]
(ii) Briefly define Specific Heat Capacity. [5MARKS]
b) During one cycle, an engine extracts $2.0 \times 10^3 J$ of energy from a hot reservoir and transfers $1.50 \times 10^3 J$ to a cold reservoir. [3MARKS]
(i) Find the thermal efficiency of the engine. [3MARKS]
(ii) How much work does this engine do in one day? [3MARKS]
(iii) How much power does the engine generate if it goes 4cycles in 2.50secs? [3MARKS]
c) What is a Carnot Cycle? [3MARKS]

QUESTION 5

- a) Define the following terms: [2MARKS]
(i) Heat [2MARKS]
(ii) Temperature [2MARKS]
(iii) Heat Transfer [2MARKS]
(iv) Internal Energy [2MARKS]
b) State the four(4) laws of thermodynamics [12MARKS]
c) Why is temperature measurement crucial? [5MARKS]

