

SEPTEMBER 2022
EBS 142
GENERAL PHYSICS THEORY I
1 HOUR

Candidate's Index Number
Signature:

UNIVERSITY OF CAPE COAST
COLLEGE OF EDUCATION STUDIES
SCHOOL OF EDUCATIONAL DEVELOPMENT AND OUTREACH
INSTITUTE OF EDUCATION

COLLEGES OF EDUCATION
FOUR-YEAR BACHELOR OF EDUCATION (B.ED)
FIRST YEAR, END-OF-SECOND SEMESTER EXAMINATION, AUG/SEPT 2022

SEPTEMBER 1, 2022

GENERAL PHYSICS THEORY I

2:30 PM – 3:30 PM

SECTION B
(40 MARKS)

Answer any TWO questions from this Section.

1. a. Define centre of gravity of a body. (1 marks)
- b. With the aid of diagrams, explain *neutral*, *stable* and *unstable* equilibrium. (9 marks)
 - i. State the principle of moments. (2 marks)
 - ii. A uniform beam 6m long and weight 4 kg rests on supports *P* and *Q* placed 1m from each end of the beam. Two masses, 10 kg and 8 kg, are placed at the ends of the beam near *P* and *Q* respectively. Calculate the reactions at *P* and *Q*. [Take $g = 9.8 \text{ ms}^{-2}$] (8 marks)
2. a. Name **three** types of thermometers and for each, state the thermometric property. (6 marks)
- b. On a Strange temperature scale, the freezing point of water is -15°S and the boiling point is $+60^\circ\text{S}$.
 - i. Establish a linear conversion relationship between the Strange temperature scale and the Celsius scale. (7 marks)
 - ii. Hence, find the temperature (in $^\circ\text{C}$) corresponding to $+15^\circ\text{S}$. (2 marks)
3. a. Explain the term *convection* as a mode of heat transfer in fluids. (6 marks)
- b. State **two** similarities and two differences between boiling and evaporation. (4 marks)
- c. i. Define the term **coefficient of linear expansion**. (2 marks)
- ii. A metal wire of length 5.0 m is heated from 20°C to 70°C . Find the new length of the wire if the coefficient of linear expansion $\alpha = 1.2 \times 10^{-5} \text{ }^\circ\text{C}^{-1}$. (8 marks)

4. a. Distinguish between a scalar and a vector quantity. (2 marks)
- b. Give one example of each and state their S.I. units. (2 marks)
- c. **Two** forces $A = (8 \text{ N}, 025^\circ)$ and $B = (12 \text{ N}, 240^\circ)$ act at a point on an object.
- Represent the information on a free body diagram. (2 marks)
 - Resolve the forces into their respective x- and y-components (4 marks)
 - Determine the magnitude and direction of the resultant due to forces A and B. (5 marks)