

OCTOBER 2023
EBS 142
GENERAL PHYSICS THEORY I
50 MINUTES

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| Candidate's Index Number |
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| 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, SEPT./OCT. 2023

3RD OCTOBER 2023

GENERAL PHYSICS THEORY I

3:50 PM – 4:40 PM

SECTION B
(30 MARKS)

Answer any two questions from this Section.

Please, note that if you answer more than two questions, only the first two will be marked.

1.
 - a. Give **one** example each of a scalar and a vector quantity and state their units. **(2 marks)**
 - b. Explain why an object weighs about six times heavier on the surface of the Earth than on the surface of the Moon. **(4 marks)**
 - c. Two forces $A = (8 \text{ N}, 065^\circ)$ and $B = (12 \text{ N}, 200^\circ)$ act at a point on an object. Find the magnitude and direction of the resultant due to A and B. **(9 marks)**

2.
 - a. State Newton's second law of motion. **(2 marks)**
 - b. Sketch a velocity-time graph for a tennis ball which bounces twice from the ground. **(5 marks)**
 - c. A ball of mass 50 g is thrown vertically upwards with a velocity of 20 ms^{-1} . Find the
 - i. maximum height reached **(3 marks)**
 - ii. time taken to return to the thrower **(3 marks)**
 - iii. potential energy of the ball half-way through its fall **(2 marks)**(Assume acceleration due to gravity $g = 10 \text{ ms}^{-2}$)

3.

- a. Define latent heat of vaporization. **(2 marks)**
- b. Describe conduction as a mode of heat transfer **(5 marks)**
- c. Heat energy is supplied to 800 g of water originally at 25°C until it boils away completely at 100°C. Calculate the amount of energy supplied. **(8 marks)**

[Specific heat capacity of water = 4200 Jkg⁻¹K⁻¹; specific latent heat of vaporisation = 2.26 x 10⁶ Jkg⁻¹]

4.

- a. Define temperature. **(2 marks)**
- b. State the thermometric property used in the design a thermocouple. **(2 marks)**
- c. A steel rod 5.0 m long is heated from 20°C to 50°C. Determine the new length of the rod if the temperature coefficient of linear expansion for steel is 1.12 x 10⁻⁵ °C⁻¹. **(7 marks)**
- d. Explain how a bimetallic strip operates **(4 marks)**