

APRIL 2023
PHY 301SW
CLASSICAL MECHANICS
30 MINUTES

Candidate's Index Number
Signature:

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

FIVE-SEMESTER BACHELOR OF EDUCATION (SANDWICH) PROGRAMME
LEVEL 350, FIRST SEMESTER QUIZ, APRIL 2023

2ND APRIL 2023

CLASSICAL MECHANICS

11:30 AM - 12:00 PM

Answer any TWO questions.
[20 MARKS]

1. Given $A = i + j$, $B = 2i - 3j + k$, $C = 4j - 3k$.

Find:

- $(A \times B) \times C$
- $A \times (B \times C)$

2. Two particles have position vectors $r_1 = 2t\mathbf{i} + (3t^2 - 4t)\mathbf{k}$ and $r_2 = (5t^2 - 12t + 4)\mathbf{i} + t^3\mathbf{j} - 3t\mathbf{k}$.

Find:

- the relative velocity.
- the relative acceleration of the second particle with respect to the first at the instant where $t = 2$.

3. A constant force F acting on a particle of mass m changes the velocity from V_1 to V_2 in time t .

- Prove that $F = m(V_2 - V_1)/t$
- Does the result in (a) hold if the force is a variable? Explain your reasoning.