

D 51772

(Pages : 2)

Name.....

Reg. No.....

**THIRD SEMESTER (CBCSS—UG) DEGREE EXAMINATION
NOVEMBER 2023**

Physics/Applied Physics

PHY 3C 03—MECHANICS, RELATIVITY, WAVES AND OSCILLATIONS

(2019—2022 Admissions)

Time : Two Hours

Maximum : 60 Marks

The symbols used in this question paper have their usual meanings.

Section A (Short Answer Type)

*Answer **all** questions in two **or** three sentences.*

Each correct answer carries a maximum of 2 marks.

1. Give the significance of mass energy relation.
2. Define with example, fictitious forces.
3. What is a conservative force ?
4. Explain length contraction.
5. What is the purpose of two stages in a rocket ?
6. Give one application of Newton's third law.
7. What is the relation connecting length and period of oscillation of a simple pendulum.
8. Give three examples for periodic motion.
9. Define a black body.
10. What are matter waves ?
11. What are the factors on which Photo electric current depends ?
12. Explain the term threshold potential.

(Ceiling - 20)

Turn over

Section B (Paragraph / Problem Type)

Answer all questions in a paragraph of about half a page to one page.

Each correct answer carries a maximum of 5 marks.

13. What is a conservative force ? Show that a central force is always conserved.
14. Show that a conservative force is represented by the relation $F = -\text{grad } U$, and curl of it is zero.
15. Find the momentum of an electron which is accelerated by a potential difference 20 volt.
16. Explain the principle of rocket propulsion.
17. With figure explain the scattering of a particle by a heavy nucleus.
18. Write the equation and explain the variation of mass with velocity.
19. Explain the terms Eigen values and Eigen vectors.

(Ceiling - 30)

Section C (Essay Type)

Answer any one in about two pages.

Answer carries 10 marks.

20. Define Damped harmonic oscillator. Derive the general equation.
21. Write law of conservation of angular momentum. Illustrate with :
 - a) Satellite motion ;
 - b) Scattering of α particle by a heavy nucleus ; and
 - c) Shape of galaxy.

(1 × 10 = 10 marks)