

D 131489

(Pages : 2)

Name.....

Reg. No.....

**THIRD SEMESTER (CBCSS—U.G.) DEGREE EXAMINATION  
NOVEMBER 2025**

Physics/Applied Physics

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

(2020-2023 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. Explain Galilean invariance.
2. What is energy function ?
3. Define P.E. curve.
4. Explain length contraction.
5. Define non-conservative force.
6. Give two examples for law of conservation of angular momentum.
7. Write down the momentum energy relation.
8. Explain anharmonic oscillations.
9. Write down the general equation of wave motion.
10. Define a black body.
11. What is photoelectric effect ?
12. What are the factors on which Photo electric current depends ?

(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. A body of mass 2 kg. is attached to a horizontal spring of  $k = 8 \text{ N/m}$  and a constant force 6 N is applied along the length. Find speed when displaced through 0.5 m.
14. Show that the force is conservative  $\mathbf{F} = yz \mathbf{i} + zx \mathbf{j} + xy \mathbf{k}$ .
15. A particle experiences a force associated with the P.E.  $U = 3x^2 - x^3$ . Find the position of stable and unstable equilibrium.
16. Define centre of mass and explain with equation.
17. If the centre of mass of three particles of masses 10, 20, 30 gm. at the point (1, 1, 1) m, then where should a fourth particle be placed so that the combined centre of mass be at (0, 0, 0) ?
18. Explain the principle and theory of satellite motion.
19. Calculate the radiated energy per unit volume of a plane wave of frequency 256 Hz and amplitude 1/1000 nm. velocity of sound = 332 m/s.

(Ceiling - 30)

**Section C (Essay Type)**

Essays - Answer in about **two pages**, any **one** question.

Answer question carries 10 marks.

20. With figure explain the theory and working of Michelson Morley experiment.
21. Define Plane progressive harmonic wave. Derive the equation for the energy density of a plane progressive wave Derive to get  $2\pi^2 n^2 a^2 \rho$ .

(1 × 10 = 10 marks)