K23U 4081

Reg. No. : .....

Name : .....

I Semester B.Sc. Degree (C.B.C.S.S. – O.B.E. – Regular/Supplementary/ Improvement) Examination, November 2023

(2019 Admission Onwards)

COMPLEMENTARY ELECTIVE COURSE IN PHYSICS

1C01 PHY : Mechanics

Time : 3 Hours

Max. Marks : 32

SECTION – A

(**All** questions are **compulsory**, **each** carries **1** mark.)

1. In simple harmonic motion the displacement of a particle in one time period is _____
2. Moment of inertia × Angular velocity equal to _____
3. Write down the expression for excess pressure inside a liquid drop.
4. What is flexural rigidity ?
5. Write down the differential equation for wave motion.

(5×1=5)

SECTION – B

(Answer **any 4** questions, **each** carries **2** marks.)

6. Define Poisson's ratio.
7. Define quality factor associated with damped harmonic oscillator.
8. What is surface energy ?
9. Draw the energy diagram of simple harmonic motion.
10. Define torque. Write the relation between torque and angular momentum.
11. What is critical velocity ? Write the expression for it.

(4×2=8)

P.T.O.

SECTION – C

(Answer **any 3** questions, **each** carries **3** marks.)

12. Given a 2 m length of steel wire with 1 mm diameter, how much will the wire stretch under a 5 kg load ? (Given Y of steel = 20×10^{10} Pa)

13. A metal plate 5 cm × 5 cm rests on the layer of castor oil 1 mm thick whose coefficient of viscosity is 1.55 Nsm^{-2}. Find the horizontal force required to move plate with a speed of 2 cm/s .

14. A particle describes simple harmonic vibrations in a line 4 cm long. Its velocity when it passes through the centre of line is 12 cm per second. Find the period of vibration.

15. A circular metal hoop of mass 1 kg and radius 0.2 meter makes 10 revolutions per second about its centre. The axes of rotation being normal to the plane of the hoop.

    a) What is the moment of inertia about the axis ?

    b) What is the angular momentum about the same axis ?

16. Calculate the frequency, period and wave number of light waves of wavelength 5000 Å. **(3×3=9)**

SECTION – D

(Answer **any 2** questions, **each** carries **5** marks.)

17. Derive an expression for bending moment of a beam.

18. State the theorems on moment of inertia. Hence derive an expression for moment of inertia of thin rod and circular disc.

19. Set up the differential equation for simple harmonic motion and obtain the expression for displacement.

20. Derive an expression for the velocity of a transverse wave in stretched string. **(2×5=10)**
