K19U 3330

I Semester B.Sc. Degree CBCSS(OBE)-Regular
Examination, November - 2019
(2019 Admissions)
COMPLEMENTARY ELECTIVE COURSE IN PHYSICS
1C01PHY : MECHANICS

Time : 3 Hours

Max. Marks : 32

SECTION - A

Answer **All** questions, each carries **1** Mark.   (5×1=5)

1. The reciprocal of bulk modulus of a substance is called_____.

2. Give an expression for coefficient of viscosity using Stoke's method.

3. Fine camphor powder is placed on the water surface. What happens to the surface tension?

4. The rate of transmission of energy across unit area of the wave front is called_____.

5. In a linear bounded medium, the rate of transference of energy is_____.

SECTION - B

Answer any **Four** questions, each carries **2** Marks.   (4×2=8)

6. What is Poisson's ratio? Give its theoretical limiting values.

7. What is meant by critical velocity of a liquid? What are the factors which it depends on?

8. Define surface tension and surface energy.

9. Derive an expression for the moment of inertia of a circular disc about an axis through its centre and perpendicular to its plane.

10. Write the differential equation of a damped harmonic oscillator.

11. Discuss the effect of temperature and pressure on the velocity of sound in air.

P.T.O.

SECTION - C

Answer any **Three** questions, each carries **3 Marks.**   (3×3=9)

12. A cantilever of length 60 cm is depressed by 18 mm at the loaded end. Calculate the depression at distance 30 cm from the fixed end.

13. By how much will the surface of a liquid be depressed in a glass tube of radius 0.02 cm, if the angle of contact of the liquid is $135°$ and its surface tension is 54.7×10^{-2} N/m? Density of liquid = 13500 kg/m^3.

14. Assuming earth to be a sphere of uniform density 5520 kg/m^3 and radius 6400 km, Calculate the moment of inertia about its axis of rotation.

15. A 3 microfarad capacitor is discharged through a 1 ohm resistance and 2 henry inductance. Calculate the frequency and quality factor of LCR circuit.

16. If the frequency of the longitudinal wave produced is 1000/sec, the density of the material of the rod 9gm/cc, the value of Young's modulus for it 9×10^{12} dynes/cm^2, Calculate the wavelength of the waves.

SECTION - D

Answer any **two** questions, each carries **5 Marks.**   (2×5=10)

17. Derive the Poiseuille's formula for the flow of a liquid through a capillary tube.

18. State and explain the theorems on moment of inertia.

19. Derive an expression for the period of a compound pendulum.

20. Derive an expression for energy density for a plane progressive wave. Show that at any instant on an average, the total energy is half kinetic and half potential in form.

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