



K22U 3268

Reg. No. :

Name :

I Semester B.Sc. Degree (C. B. C. S. S. – Supplementary)
Examination, November 2022
(2016 – 2018 Admissions)
COMPLEMENTARY COURSE IN PHYSICS
1C01PHY : Mechanics

Time : 3 Hours

Max. Marks : 32

*Instruction : Write answers in **English only**.*

SECTION – A

(Very short answer type – **Each** carries **1** mark – Answer **all 5** questions).

1. Theoretical limiting values of Poisson's ratio are _____ and _____.
2. Velocity of longitudinal waves moving in rods is given by _____.
3. Period of torsion pendulum is given by _____.
4. Moment of inertia of a circular disc about an axis through its centre and perpendicular to its plane is given by _____.
5. Write the expression for de-Broglie wavelength. (5×1=5)

SECTION – B

(Short answer type – **Each** carries **2** marks – Answer **4** questions out of **6**).

6. Give the relation connecting Young's modulus, bulk modulus and Poisson's ratio.
7. Write the expression for energy density and explain the terms.
8. Represent graphically the variation of potential energy, kinetic energy and total energy of a harmonic oscillator.
9. Define quality factor. Give its expression.
10. Explain the parallel axes theorem.
11. State the uncertainty principle. (4×2=8)

P.T.O.



SECTION – C

(Short essay/problem type – **Each** carries **3** marks – Answer **3** questions out of **5**).

12. Calculate the work done in twisting a rod through an angle θ .
13. Check whether $y = 2\sin x \cos vt$ is a solution to the one dimensional wave equation.
14. A particle executing SHM has an acceleration of 0.02 m/s^2 when its displacement is 0.08m . Find its time period of oscillation.
15. Show that the moment of inertia of a sphere of radius 'R' and mass 'M' about a tangent line in the plane of the sphere is $\frac{7}{5} MR^2$.
16. Calculate the de-Broglie wavelength of an electron with a velocity of 10^7 m/s ,
 $m = 9.1 \times 10^{-31}\text{Kg}$. **(3×3=9)**

SECTION – D

(Long essay type – **Each** carries **5** marks – Answer **2** questions out of **4**).

17. What is a cantilever ? Derive an expression for the depression at the free end of a cantilever clamped at one end and loaded at the other end.
 18. Derive an expression for the velocity of transverse vibrations in stretched string.
 19. Derive an expression for the period of oscillation of a compound pendulum. Also describe the experiment to determine 'g' using compound pendulum.
 20. Derive an expression for the moment of inertia of a solid cylinder :
 - i) about its axis.
 - ii) about an axis passing through its centre and perpendicular to its length.**(2×5=10)**
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