

LOYOLA COLLEGE (AUTONOMOUS), CHENNAI-600 034
B.Sc. DEGREE EXAMINATION-CHEMISTRY
FIRST SEMESTER – APRIL 2002
PHY 101 PHYSICS FOR CHEMISTRY

23.04.2002

1.00-4.00

Max: 100 Marks

PART-A

Answer ALL questions

(10 x 2 = 20 Marks)

01. Sketch the variation of Velocity of a uniformly accelerated motion with time.
02. State the laws of conservation of angular momentum.
03. What is meant by weightlessness of a body?
04. What is gravitational potential?
05. State Hooke's law of elasticity and mention its region of validity.
06. What are the dimensions of (i) Coefficient of viscosity and (ii) Surface tension?
07. Mention few failures of classical mechanics in explaining atomic motion.
08. Write down the time-independent Schrodinger equation.
09. Distinguish between Pitch and quality of sound
10. List any two differences between stationary and progressive waves.

PART-B

Answer any FOUR

(4 x 7 ½ = 30 Marks)

11. Show that oscillations of a liquid in U tube is simple harmonic. Hence determine the time-period of oscillations.
12. Obtain expressions for mass of Sun and density of earth.
13. Obtain an expression for energy stored in a wire, subjected to static torsion and Longitudinal stress.
14. Using uncertainty principle, obtain radius of Bohr orbit.
15. Derive an expression for Velocity of longitudinal waves in strings.

PART-C

Answer any FOUR

(4 x 12 ½ = 50 Marks)

16. Obtain an expression for acceleration of a ball rolling down an inclined plane. You are given Solid Sphere and Hollow Sphere both of same radius and mass. They are allowed to roll down an inclined plane. Which will reach bottom first and why? (8 + 4 ½)
17. Derive the relation connecting three moduli of elasticity. You are given that Young's modulus of a material is $10 \times 10^{10} \text{ N/m}^2$ and Rigidity modulus = $3 \times 10^{10} \text{ N/m}^2$. Calculate its bulk modulus of elasticity. (8 + 4 ½)
18. a) Obtain an expression for Coefficient of Viscosity of a liquid by Poiseuille's flow method.
- b) Pressure difference between the ends of a capillary tube is 50 cm of Mercury. Water is allowed to flow through the tube of radius 0.1 mm. Calculate the volume rate of flow of liquid, if the length of the tube is 1 m and Co-efficient of Viscosity is $1 \times 10^{-3} \text{ Nsm}^{-2}$. (8 + 4 ½)
19. Describe the Davidson and Germer experiment to determine wave like nature of moving electrons. Discuss how the dual characters of electrons can be reconciled on the basis of de Broglie theory.
20. a) Explain the method of verifying laws of transverse vibrations using a sonometer.
- b) Tuning fork of frequency 512Hz is used to vibrate brass wire of radius 0.1 mm which subjected to tension. If the resonating length is 50 cm, Calculate the tension in the wire. Density is 7700 Kg/m^3 .

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