LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – **CHEMISTRY**

SECOND SEMESTER – **APRIL 2016**

PH 2105 / PH 2103 - PHYSICS FOR CHEMISTRY - I

Date: 26-04-2016   Dept. No.   Max. : 100 Marks
Time: 01:00-04:00

Part A

Answer **all** questions: **(10×2=20marks)**

1. What is meant by angular velocity and give the relation between linear and angular velocity.

2. Define holonomic and non – holonomic constraints.

3. State Newton's law of gravitation.

4. State the postulates of general theory of relativity.

5. Calculate the elastic energy stored in a wire originally 5 m long and 10^{-3} m in diameter which has been stretched by 2×10^{-4} m by a load of 5 kg.

6. Write Stoke's formula for the viscous force.

7. What is optical activity?

8. Differentiate between Fresnel and Fraunhofer diffraction.

9. What are the lattice parameters of a unit cell?

10. What are Miller indices?

Part B

Answer any **FOUR** questions: **(4×7.5 = 30marks)**

11. What is projectile motion? Derive an expression for time of flight and range of a body projected at an angle θ with the horizontal.

12. What is parking orbit? Calculate the radius of parking orbit for earth.

13. Derive an expression for the torsional couple per unit twist.

14. Explain the construction of a Nicol prism and its use in analyzing a plane polarized light.

15. With suitable diagrams explain in detail the seven classes of crystal.

16. Discuss the phenomenon of Fraunhofer diffraction at a single slit.

Part C

Answer any **FOUR** questions: **(4×12.5 = 50marks)**

17. Set up the Lagrangian and solve for the equations of motion for **(1.5)**

   (a) A simple pendulum **(5.5)**

   (b) An Atwood's machine. **(5.5)**

18. With a neat diagram describe Boy's experiment to determine universal gravitational constant G.

19. (a) With a neat diagramderive an expression to find the excess pressure over the curved liquid surface.

          (10)

   (b) Calculate the excess pressure inside a small soap bubble of radius 3×10^{-3} m. surface tension of soap solution is 20×10^{-3} N/m **(2.5)**

20. Define Young's modulus, bulk modulus, rigidity modulus and derive the relation between them.

21. Give the theory of a plane transmission grating and describe how it tis used to determine the wavelength of light.

22. (a) State Bragg's law. Explain the powder diffraction experimental method of analyzing structure of polycrystalline materials. **(9.5)**

   (b) The lattice constant for a unit cell of aluminium is 4.049 Å. Calculate the spacing of (2 2 0) plane.

          (3)

****