LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

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

SECOND SEMESTER – APRIL 2010

PH 2103 - PHYSICS FOR CHEMISTRY - I

Date & Time: 22/04/2010 / 1:00 - 4:00   Dept. No.   Max. : 100 Marks

PART-A

Answer ALL questions.   (10 x 2 = 20 marks)

1. Sketch the distance-time and velocity-time graphs of uniformly accelerated motion.
2. Define the term constraints.
3. Given that acceleration due to gravity is 9.8 m/s^2 and radius of the earth is 6400 km, estimate the value of escape velocity.
4. What are parking orbits?
5. Find the energy stored in stretching a wire of 2 m length and 1 sq mm cross section through 0.1 mm. Young's modulus of material is 2×10^{11} Nm^{-2}.
6. Define surface tension.
7. What are the differences between Fresnel and Fraunhoffer diffractions?
8. What is optical activity?
9. Define unit cell in a crystal lattice.
10. State Bragg's law.

PART-B

Answer any FOUR questions.   (4 x 7.5 = 30 marks)

11. What is a projectile? Derive expressions for range, time of flight and maximum height reached.
12. Obtain expressions for mass of the Sun and Earth's density, using the law of gravitation.
13. Explain with necessary theory Quincke's method for determining the surface tension of mercury.
14. What is circularly polarized light? How is it produced in the laboratory with the help of a quarter wave plate?
15. Write a short note on (a) NaCl type crystal and (b) ZnS type crystal.

PART-C

Answer any FOUR questions.   (4 x 12.5 = 50 marks)
16. Set up the Lagrangian and solve the Lagrange's equation of motion for
     (a) Atwood's machine   (b) Simple pendulum.
17. Explain in detail the three experimental tests of general theory of relativity.
18. a) Derive the Poiseuille's formula for the viscosity of a liquid.   (10)
    b) Calculate the excess pressure inside a soap bubble of radius 3×10^{-3} m. Surface tension of soap solution is 20×10^{-3} N/m. Calculate also the Surface energy of the soap bubble.   (2.5)
19. Give the theory of diffraction grating. Describe in detail how you would use a transmission grating for measuring the wavelength of light.
20. (a) List the three dimensional Bravais lattices.   (3.5 + 9)
    (b) With a neat diagram, describe the Rotating-crystal method of crystal structure determination.

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