LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

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

SECOND SEMESTER – **APRIL 2015**

PH 2105 / PH 2103 - PHYSICS FOR CHEMISTRY - I

Date : 20/04/2015 Dept. No. Max. : 100 Marks

Time : 01:00-04:00

Part – A

Answer **ALL** Questions: **(10 x 2 = 20)**

1. Define velocity and acceleration.
2. What are generalized coordinates?
3. State Newton's law of gravitation.
4. State the postulates of special theory of relativity.
5. DefinePoisson's ratio.
6. Calculate the excess pressure inside a small air bubble of radius 10^{-3} m. Given the surface tension of water is 70×10^{-3} Nm^{-1}.
7. Explain the function of a quarter wave plate.
8. Mention any two applications of a polaroid.
9. What are Bravais lattices?
10. State Bragg's law.

Part – B

Answer any **FOUR** Questions: **(4 x 7.5 = 30)**

11. Set up the Lagrangian and solve the Lagrange's equation of motion for an Atwood's machine.
12. Define escape velocity. Show that the escape velocity for an object to escape from the surface of the earth is 11km/s.
13. Derive Poisueille's formula for the rate of flow of a liquid through a capillary tube.
14. (i) Explain Huygen's theory of double refraction. **(3)**

    (ii) Write a note on production of plane polarized light using a Nicol prism? **(4.5)**
15. With a neat diagram, describe the powder method to determine crystal structure.
16. Derive an expression for the couple per unit twist of a cylindrical wire.

Part – C

Answer any **FOUR** Questions: **(4 x 12.5 = 50)**

17. (i)Explain distance – time and velocity – time graphs for a particle moving with constant velocity. (ii) What is a projectile? Derive expressions for range, time of flight and maximum height reached. **(5+7.5)**
18. (i) State the Newton's law of gravitation. **(3)**
    (ii) Obtain the expressions for mass of the Sun and Earth's density using the law of gravitation. **(6.5)**
    (ii) Write short note on gravitational red shift. **(3)**
19. Obtain the relation connecting the three moduli of elasticity.
20. Give the theory of a diffraction grating. Describehow you would use a transmission grating for measuring the wavelength of light.
21. (i) Write a short note on (a) NaCl type crystal and (b)ZnS type crystal. **(6)**
    (ii) What are Millers indices? Write the procedure for finding Miller indices of a given plane. **(6.5)**
22. Discuss in detail the production and detection of circularly and elliptically polarized light.

****