LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

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

THIRD SEMESTER – APRIL 2010

PH 3202 - PHYSICS FOR CHEMISTRY - II

Date & Time: 30/04/2010 / 1:00 - 4:00 Dept. No. Max. : 100 Marks

SECTION – A

Answer all the questions **(10 x 2 = 20)**

1. Distinguish between Fresnel and Fraunhoffer diffraction.
2. Determine the specific rotation of the given sample of sugar solution if the plane of polarization is turned through 13.2º. The length of the tube containing 10% sugar solution is 20 cm.
3. State Kirchoff's laws of electrical network.
4. For flash pictures, a photographer uses a capacitor of 30μF and a charger that supplies 3×10^3 V. Find the charge and energy expended in joule for each flash.
5. State Pauli's exclusion principle.
6. Define radioactive equilibrium.
7. Write the characteristics of an ideal operational amplifier.
8. What is a Filp–flop?
9. State Bragg's law.
10. Define Unit Cell.

SECTION – B

Answer any Four questions **(4 x 7 ½ = 30)**

11. What is a Quarter wave plate?
    Explain the construction of the Quarter wave plate. How is it used to produce elliptically polarized light?
12. (a) Define specific resistance. Give its unit. (2 marks)
    (b) Describe an experiment to calibrate a low range voltmeter using potentiometer. (5 ½ marks)
13. Derive expressions for half life and mean life of a radioactive substance.
14. Construct K-map for the following and write the reduced Boolean function.
    $Y = \Sigma\ 0, 2, 5, 7, 8, 10, 13, 15$

15. Write a short note on

(a) Sodium chloride structure.

(b) Cesium chloride structure.

SECTION – C

Answer any Four questions **(4 x 12 ½ = 50)**

16. Explain the theory of Fraunhoffer diffraction at a single slit.

17. (a) Obtain an expression for the field along the axis of a narrow circular coil, due to a current flowing in it. (10 mark)

(b) Compute the flux density B at a point P distant 2 meter from the center of a circular coil of radius 10 cm carrying a current of 5 ampere. The point is situated on the axis of the coil. (2 ½ marks)

18. (a) Obtain an expression for the energy of the electron in the n^{th} orbit of the hydrogen atom. (7 ½ marks)

(b) Write a short note on cosmic rays. (5 marks)

19. (a) With necessary circuit diagram explain the working of an operational amplifier as

(i) Summing amplifier

(ii) Differentiator (8 marks)

(b) With a neat logic circuit diagram and truth table explain half binary adder. (4 ½ marks)

20. (a) List the three dimensional Bravais lattices. (3 ½ marks)

(b) With a neat diagram, describe the Rotating – crystal method of crystal structure determination. (9 marks)

****