LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

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

THIRD SEMESTER – **NOVEMBER 2012**

# PH 3202 - PHYSICS FOR CHEMISTRY - II

 Date : 09/11/2012 Dept. No. Max. : 100 Marks

 Time : 9:00 - 12:00

**PART – A**

Answer **ALL** questions: (10x2=20)

1. Find the compliment of (A + B)(B + C)(C + A)
2. What are shift registers?
3. State Pauli’s exclusion principle.
4. Mention any two applications of X - rays
5. What is Bohr magneton?
6. Write down the semi – empirical mass formula.
7. What is the effect of humidity on the velocity of sound?
8. Distinguish between reverberation and echo.
9. Find the de Broglie wave length associated with a thermal neutron at room temperature 37oC? k = 1.38 x 10-23JK-1 and h = 6.63 x 10-34J s-1
10. Write down the Schrodinger wave equation of a particle moving through a potential V = kx2

**PART – B**

Answer any **FOUR** questions (4x7.5=30)

1. Explain the working of a clocked R S flip flop using NAND gates.
2. Explain the formation of sodium doublet.
3. Write a short notes on any three properties of a nucleus.
4. With a neat circuit diagram explain the production of ultrasonic waves by Piezoelectric effect.
5. Using uncertainty principle, prove that electron cannot exist inside the nucleus and hence evaluate the Bohr radius.

**PART – C**

Answer any **FOUR** questions (4x12.5=50)

1. Realize using only NAND gates the following combinational circuit. Use K map to obtain the minimal expression $F\left(A,B,C,D\right)=Σ\left(2, 3, 4, 6, 10, 11, 15\right)+\sum\_{d}^{}(7, 12,13)$
2. State the laws of photoelectric emission? Obtain Einstein’s photoelectric equation.
3. Study the variation of binding energy with atomic mass. Explain how this graph can be used to identify two mechanisms of nuclear energy.
4. Obtain Newton’s formula for velocity of sound in gases. Why did Laplace correct this expression? What is the correct expression?
5. With a neat schematic explain how the wave nature of a moving particle was established through Davisson – Germer experiment.