LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – MATHEMATICS

FOURTH SEMESTER – APRIL 2010

PH 4206 / 4200 - PHYSICS FOR MATHEMATICS - II

Date & Time: 19/04/2010 / 9:00 - 12:00   Dept. No.   Max. : 100 Marks

PART – A

Answer all questions :-   10x2=20marks

1. $(125)_{10} = (x)_2 = (y)_{16}$. Find x,y.
2. Prove $A+AB = A$
3. State Pauli's exclusion principle
4. Define threshold frequency
5. What is binding energy?
6. What are baryons?
7. What is the effect of humidity on velocity of sound?
8. Define reverberation time.
9. Find the smallest possible uncertainty in the position of an electron moving with a velocity of $3x10^7$m/s.
10. State Stefan's law.

PART – B

Answer any four questions :-   4x7.5 = 30marks

11. Explain the working of RS flip flop with a neat circuit.
12. Describe the different types of photoelectric cells and explain their action.
13. Describe the Davisson and Germer experiment for the study of electron diffraction with a neat diagram.
14. Derive the expression for velocity of transverse wave along a stretched string.
15. What are nuclear forces? Explain the liquid drop model.

PART – C

Answer any four questions :-   4x12.5 = 50marks

16. Obtain the sum-of-products expression for the given function using Karnaugh map. Realize the expression by NAND-NAND network.
    $F(A,B,C,D) = \sum (0,3,4,7,8) + \sum_d (10,11,12,13,14,15)$.
17. Discuss in detail the Bohr's atom model. Derive an expression for radius of the Bohr's orbit and energy of the electron.
18. a) Derive Newton's formula for velocity of longitudinal waves and discuss Laplace correction.
    b) Discuss the effect of temperature, pressure, humidity and density on velocity of sound.
19. a) What was Planck's hypothesis to explain spectral distribution from a blackbody?
    b) A metallic surface when illuminated with wavelength 3333A, emits electrons with energies upto 0.6eV and when illuminated with light of wavelength 2400A, it emits electrons with energies upto 2.04eV. Calculate Planck's constant.
20. What are Ultrasonic waves? Describe any two methods of production and detection. Give some of their important applications.

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