DIRECTORATE OF DISTANCE EDUCATION

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M.Sc. (Physics) Assignment, June, 2023 First Year

COURSE CODE: PHY101

1. What do you mean by eigen values and eigen vectors? What role they play in diagonalization of matrices, explain with examples.
2. State and prove Taylor's theorem.
3. What is a central force? For a particle moving under a central force field, show that its energy restrains constant.

COURSE CODE: PHY 102

1. What are the postulates of quantum mechanics? Discuss in detail.
2. Give the theory of first order stark effect for the first excited state (n=2) of hydrogen atom.
3. Give an account of time independent perturbation theory to obtain first order correction theory.

COURSE CODE: PHY 103

1. State and prove De Morgan's theorem. What is meant by De Morganization?
2. Describe the working of a Wien bridge oscillator with suitable circuit diagram and obtain expression for frequency and condition for sustained oscillation.
3. What is multivibrator? With a neat circuit diagram, explain the construction of working of a monostable multivibrator.

COURSE CODE: PHY105

1. Derive Pauli spin matrices and obtain commutation relations among them.
2. Give an account of partial wave expansion method for finding differential cross section of scattering.
3. Write short notes on the following:
   (a) Approximation Method
   (b) Phase Shift
   or
   (a) Magnetic Moment of Dirac Electron
   (b) Covariant form of Dirac Equation.

COURSE CODE: PHY106

1. Discuss the phenomenon of Bose-Einstein's condensation on the basis of Bose Einstein Statistics.
2. What do you mean by phase transition of second type? Discuss one dimensional lsing model.
3. Write short noted on the following:
   (a) Density matrix
   (b) Harmonic oscillator
   Or,
   (c) Fermi energy level
   (d) Liouville's theorem

COURSE CODE: PHY107

1. What is Paschen-back effect? Explain the spectrum of single valence electron using this effect.
2. With the help of next sketch explain the principle, construction and working of Ruby Laser.
3. Discuss, in brief the construction and working of optical fibres. How it helps in communication in modern information technology system?
   or,
   Discuss coupling scheme of two valence electron system and obtain expression for interaction energy associated in L-S coupling.

Note: Last date of Assignment submission (By Post only) – 20.05.2023
Send only by Post. (Postal Address:- Director, Directorate of Distance Education, L.N. Mithila University, Denvi Road, Darbhanga- 846004)