MALAVIYA NATIONAL INSTITUTE OF TECHNOLOGY JAIPUR

Department/Centre : Department of Physics

Course Code : PHP503

Course Name : Electronics Lab

Credits : 4 **L -** 0 **T -** 0 **P -** 8

Course Type : Core

Prerequisites : none

Course Contents

1. To study the characteristics and applications of Operational Amplifier.
2. To study D/A converter
3. To study A/D converter.
4. To study astable, monostable and bistable multivibrator.
5. To study the transistor bias techniques and stability.
6. To study different types of oscillators.
7. To study the characteristics of Field effect amplifier.
8. To study the Klystron characteristics.
9. To study the characteristics of following types of active and passive filters:
   (i) Low pass filter
   (ii) High pass filter
   (iii) Band pass filter
10. To verify the following Network theorems:
    (i) Superposition theorem
    (ii) Maximum power transfer theorem
    (iii) Thevenin's theorem
    (iv) Norton's theorem

Recommended Readings

1. Text book-
   1. Digital Principles and Applications, D. P. Leach, A. P. Malvino (McGraw-Hill Education)
   2. Digital Electronics, S. Ghoshal (Cengage India Private Limited)
   3. Op-Amps and Linear Intergrated Circuits: R. A. Gayakwad (PHI)
2. Reference book-
   1. Fundamentals of Digital Circuits, A. Anand Kumar (Prentice-Hall of India Pvt. Ltd)
   2. Electronic Devices and Circuit Theory: Robert Boylestad and Louis Nashdsky (PHI)
   3. Digital Fundamentals: Floyd & Jain (Pearson Education)

MALAVIYA NATIONAL INSTITUTE OF TECHNOLOGY JAIPUR

Department/Centre : Department of Physics

Course Code : PHP 509

Course Name : Nuclear Physics & Spectroscopy Lab

Credits : 4 **L -** 0 **T -** 0 **P -** 8
Course Type : Core
Prerequisites : none

Course Contents

1. To calibrate and determine the resolution of the Gamma ray spectrometer.

2. To identify the unknown source by its peak energy value analysis.

3. I. To study the characteristics of the GM tube and determine its operating voltage, plateau length and slope with determination of efficiency for beta and gamma radiation.

   II. To determine the linear and mass attenuation coefficients using gamma source using GM counter.

4. To determine the hall coefficient for the given sample.

5. To measure the electrical resistivity of the given sample using four probe method.

6. To study the electron spin resonance and to determine the Lande's g- factor.

7. To study the temperature dependence of ultrasonic velocity and Young's modulus for the given solid specimen.

8. To study the dispersion relation for mono-atomic and di-atomic lattice by showing comparison with theory.

9. To study normal Zeeman effect in transverse and longitudinal configuration.

Recommended Readings

1. Text book-
   1. Introduction to experimental nuclear physics, R. M. Singru (Wiley Eastern Pvt.Ltd.)
   2. Introductory Nuclear Physics: K. S. Keane (Wiley).
   3. Fundamentals of Molecular Spectroscopy: C. N. Banwell and E. M. McCash (McGraw)
2. Reference book-
   1. Techniques for Nuclear and Particle Physics Experiments: W. R. Leo (Springer, 1994).
   2. Molecular Spectroscopy: K. V. Raman, R. Gopalan and P.S. Raghavan (Thomson).

MALAVIYA NATIONAL INSTITUTE OF TECHNOLOGY JAIPUR

Department/Centre : Department of Physics

Course Code : PHP 603

Course Name : Solid State Physics Lab

Credits : 4 **L -** 0 **T -** 0 **P -** 8
Course Type : Core
Prerequisites : none

Course Contents

1. To study the characteristics of an optical fibre and determine its numerical aperture.

2. To study the Gaussian nature of laser beam and carry out the diffraction experiments.

3. To study speed of ultrasonic velocity in liquids and measure elasticity parameters.

4. To record a Frank Hertz curve for mercury and measure the energy emission of free electrons in a gas filled triode.

5. To measure the magnetic susceptibility of paramagnetic solution by Quincke's method and to find the ionic molecular susceptibility and magnetic moment.

6. To determine the curie temperature of a given solid and study the magnetic transition.

7. To study the Bragg's law by microwave diffraction.

8. To study the Faraday Effect and calculate the Verdet's constant.

Recommended Readings

1. Text book-
   1. Introduction to Solid State Physics: C. Kittel, 7th Ed. (John Wiley and Sons).
   2. Solid State Physics: N. Ashcroft and N.D. Mermin (Holt, Rinehart and Winston).
   3. Solid State Physics: A.J. Dekker (Prentice Hall of India, New Delhi).
   4. Magnetism in Condensed Matter: Stephen Blundel (Oxford Master Series in Condensed Matter Physics).
2. Reference book-
   1. Solid State Physics: Azaroff (McGraw Hill).
   2. Solid State Physics: M.S. Rogalski and S.B. Palmer (Gordon & Breach Science Pub.).
   3. Solid State Physics: Gerald Burns (Academic Press).