SEMESTER-VI

PHYDSM351P

LAB: (MECHANICS +OPTICS) AND (ELECTRICITY + ELECTRONICS)

Contact Hours: 60

Full Marks = 100 [ESE (70) CCA(30)]

Course objective: *In this course, the students will learn to use various instruments, estimate various physical parameters for every experiment performed and report the result of experiment related to mechanics, optics, electricity and electronics.*

Two Experiments are to be performed – one from each part

Part-A: Mechanics + Optics

1. To determine the Moment of Inertia of a regular body by torsional pendulum.
2. To determine the Young's Modulus of a Wire by Searle's Method.
3. To determine the Modulus of Rigidity of a Wire by Statistical method.
4. To determine g by Bar Pendulum.
5. To study the Motion of a Spring and calculate (a) Spring Constant (b) Value of g.
6. To determine the focal length of convex mirror with the help of convex lens by optical bench.
7. Determination of the refractive index of the material of a convex lens by measuring its focal length and radii of curvatures.
8. To determine the refractive index of a given liquid by travelling microscope.
9. To determine the angle of minimum deviation of the angle of the given prism with the help of spectrometer & hence to find the refractive index of the material of the prism.
10. To determine wavelength of sodium light using Newton's Rings.

Part-B: Electricity + Electronics

1. To determine the specific resistance by metre bridge.
2. To determine the strength of the magnetic field produced at the centre of the tangent galvanometer coil due to a current flowing in it and hence to determine horizontal component of earth's magnetic field.
3. To determine the self-inductance of a coil and its internal resistance in an L-R circuit.

4. To study the series LCR circuit and determine its (a) Resonant Frequency, (b) Quality Factor.
5. To determine the resistance of a galvanometer by half deflection method.
6. To determine a resistance per unit length of metre bridge wire by Carey Foster's method.
7. To verify series and parallel laws of resistance by Post office Box.
8. To compare the emf of two cells by potentiometer.
9. To study V-I characteristics of PN junction diode.
10. To study the V-I characteristics of a Zener diode and its use as voltage regulator.
11. To verify the truth tables of AND, OR, NOT, NOR and NAND gates.
12. To study and verify NAND and NOR gates as a universal gate.
13. To design and verify the De Morgan's theorem.

Expected learning outcomes: *At the end of the above course the students will have hands-on knowledge and overview of various experiments related to various key aspects of mechanics, optics, electricity and electronics.*

Reference books:

i. Advanced Practical Physics for students, B.L.Flint and H.T.Worsnop, 1971, Asia Publishing House.

ii. Advanced level Physics Practicals, Michael Nelson and Jon M. Ogborn, 4th Edition, reprinted 1985, Heinemann Educational Publishers.

iii. Engineering Practical Physics, S.Panigrahi & B.Mallick,2015, Cengage Learning India Pvt. Ltd.

iv. A Text Book of Practical Physics, Indu Prakash and Ramakrishna, 11th Edition, 2011, Kitab Mahal, New Delhi.

v. Advanced Practical Physics for students, B.L.Flint & H.T.Worsnop, 1971, Asia Publishing House.

vi. A Text Book of Practical Physics, Indu Prakash and Ramakrishna, 11th Edition, 2011, Kitab Mahal, New Delhi.

vii. Engineering Practical Physics, S.Panigrahi & B.Mallick, 2015, Cengage Learning India Pvt. Ltd.

viii. Advanced level Physics Practicals, Michael Nelson and Jon M. Ogborn, 4th Edition, reprinted 1985, Heinemann Educational Publishers.