SAURASHTRA UNIVERSITY

RAJKOT, 360005.

Syllabus for the Subject of PHYSICS

under the Faculty of SCIENCE

Accredited Grade A by NAAC

B.Sc.-Sem: 1&2 (Physics)

In force from June - 2016.

SAURASHTRA UNIVERSITY

At: RAJKOT, State: Gujarat,Pin: 360005.

B.Sc. Semester -2

P-201 : Physics Theory

(In force from June-2016)

(Wave, Optics & Semiconductor Devices)

60 hour 70 marks

UNIT -1: (12 hour: 14 Mark)

Wave Motion and Waves in a String: Wave motion, Transverse Wave Travelling in String, Velocity of a Wave in a String, Interference and the principle of Superposition, Standing waves on a String, Normal Modes of a String, Laws of Transverse Vibrations of a String, Numerical Examples.

Sound: Speed of Sound Wave in a material medium, Speed of Sound in Gas-Newton's Formula and Laplace's Correction, Intensity and loudness of Sound Wave - Decibels, Beats, Musical Scale, Acoustics of Buildings, Application of Acoustic phenomena, Doppler Effect, Numerical Examples.

Reference books:

1. Concept of physics By H C Verma part 1 Publisher:Bharati Bhawan
2. Sears and Zemansky's University Physics with modern physics
By H D Young Publisher: PEARSON

UNIT -2: (12 hour: 14 Mark)

Semiconductor Diode: Use of Diode in Rectifiers, Half-Wave Rectifier, Full-Wave Rectifier, Centre-tap Rectifier, Bridge Rectifier, Performance of Half-Wave & Full-Wave Rectifier (Rms value of current, Ripple factor, Rectification Efficiency), Comparison of Rectifiers , Filter Circuit, Capacitor Filter, Inductor Filter, LC filter, π Filter, Review of Zener diode, Zener Diode as Voltage Regulator, Numerical Examples.

Transistor: Structure of Transistor, Types of BJT, Action of a Transistor, Working of a Transistor, Relation Between Different Current in Transistor, Three Configurations of Transistor, Transistor Characteristics (CB and CE Configuration), Comparison between the three configurations, Why CE Configuration is preferred in Circuit, Numerical Examples.

Reference books:

1. Basic electronics and linear circuits By N N BhargavA, D C Kushreshtha & S C Gupta , Publisher: Technical Teachers Training Institute Chandigarh.
2. Elements of Electronics By Bagde & Singh Publisher : S.chand
3. Principles of electronics By V.K.Mehta Publisher: S.Chand 4.
4. Electronic Device And Circuits By Allen Mottershead Pub: PHI

UNIT -3: (12 hour: 14 Mark)

Wave Optics: Interference: Electromagnetic nature of Light, Wave Front, Huygens Principle.

Superposition of Waves, Conditions for Interference, Techniques of Obtaining Interference: Division of Amplitude and Division of Wave front, Young's Double Slit Experiment, Lloyd's Single Mirror- Determination of Wavelength of Light, Fresnel Biprism – Experiment Arrangement & Determination of Wavelength of Light, Interference in Thin Films, Types of thin film -Parallel and wedge-shaped films, Newton's Rings: Determination of Wavelength of Light & refractive index, Numerical Examples.

UNIT -4: (12 hour: 14 Mark)

Wave Optics: Diffraction: Types of Diffraction-Fraunhofer and Fresnel Diffraction, Fraunhofer Diffraction at single slit, Fraunhofer Diffraction at Double Slit, Plane Diffraction Grating, Fraunhofer Diffraction at Plane Diffraction Grating.

Rectilinear Propagation of Light and Half-Period Zones, Zone Plate, Action of Zone Plate, Comparison Between Zone Plate and Convex Lens, Diffraction Pattern of a straight edge, Numerical Examples.

UNIT -5: (12 hour: 14 Mark)

Wave Optics: Polarization: Polarized Light, Production of Polarized Light- By Selective Absorption, By Reflection, By Scattering, By Double Refraction, Polarizer and Analyzer, Nicol Prism, Numerical Examples.

Geometrical Optics: Fermat's Principle of Least Time, Law of reflection & Law of refraction from Fermat's Principle, Cardinal Points, Nodal Points and Nodal Planes, Properties of Nodal Points, Construction of the Image Using Cardinal Points, Newton's Formula , Relation between f_1 and f_2, Dispersion by a Prism, Angular Dispersion, Dispersive Power, Numerical Examples.

Reference Books for unit 3,4,5 :

1. A Text Book Of OPTICS By N.Subrahmanyam, Brijlal, M.N. Avadhanulu Publisher: S.chand.
2. Principle of OPTICS By B.K.Mathur Publisher: Gopal Printing
3. Fundamentals of OPTICS By Jenkins and White Publisher: McGraw-Hill
4. Fundamentals of OPTICS By Gulati and Khanna Publisher: R.Chand

LIST OF EXPERIMENTS

B.Sc. Semester-II

1. To determine the unknown frequency of Tuning Fork By Melde' s Experiment
2. To Verify the Laws of vibrating strings by Melde's Experiment.
3. To Study the Resonator and to determine unknown frequency of tuning fork.
4. To Calibrate a Spectrometer.
5. To Study Dispersive curve, and to determine the dispersive power of the material of a prism for different colours.
6. To determine wavelength of light using Newton's Ring.
7. To study the CB Characteristic of Transistor.
8. To study the CE Characteristic of Transistor.
9. To study Half-Wave Rectifier.
10. To study Full-Wave Rectifier (Centre tap).
11. To study Bridge Rectifier.
12. To Study of a Transformer.
13. To study Characteristics of Photo diode.
14. To study Deflection magneto meter (one magnet and two magnets).

Reference Books:

1. B.Sc. Practical physics By C.L.Arora Pub: S.chand
2. A text book of Practical Physics By Indu Prakash & Ramkrishna Pub: Kitab Mahal, New Delhi.
3. Practical Physics By S.L.Gupta and V. Kumar Pub: Pragati Prakashan, Meerut.
4. B.Saraf et aI-Physics through experiments Vol. I & II

Instruments List

Practical 1: Tuning Fork, Stand with Clamp, Pulley, Weight Box, Light Weight Pan, String.

Practical 2: Tuning Fork, Stand with Clamp, Pulley, Weight Box, Light Weight Pan, String.

Practical 3: A resonator, rubber tubing, pinch cock, clamp stand, set of tuning forks, graduated cylinder

Practical 4: Prism, Spectrometer, Spirit Level, Mercury Vapour Lamp, Wooden Box with Aperture, Eye Piece, Lamp.

Practical 5: Prism, Spectrometer, Spirit Level, Mercury Vapour Lamp, Wooden Box with Aperture, Eye Piece, Lamp.

Practical 6: Travelling Microscope, Sodium vapour Lamp, Newton's Rings apparatus Consisting optically plane glass and a convex lens of about 100 Cm focal length placed in box having an optically plane glass plate inclined at an angle of 45^0, Spectrometer or microscope, convex lens of Short Focal Length.

Practical 7: P-N-P Transistor OR N-P-N Transistor CB Characteristic Circuit Board, Battery(0-3 Volt & 0-10 Volt), Two MiliAmeter (0-25mA), Voltmeter (0-3 volt & 0-10Volt)

Practical 8: P-N-P Transistor OR N-P-N Transistor CE Characteristic Circuit Board,

Battery (0-3 Volt & 0-10 Volt), MiliAmeter (0-25mA), Micrometer, Voltmeter (0-3 volt & 0-10Volt)

Practical 9: Half Wave Rectifier Circuit Board, MiliAmeter (0-100mA), A.C. Voltmeter, D.C. Voltmeter OR VTVM.

Practical 10: Full Wave Rectifier Circuit Board, MiliAmeter (0-100mA), A.C. Voltmeter, D.C. Voltmeter OR VTVM.

Practical 11: Half Wave Rectifier Circuit Board, MiliAmeter (0-100mA), A.C. Voltmeter, D.C. Voltmeter OR VTVM.

Practical 12: Step-down Transformer, Rheostat, A.C. Milliammeter (0-500 ma), A.C. Voltmeter (0- 10 V).

Practical 13: Photo Diode, Battery, Light Source, Milliammeter, Voltmeter.

Practical 14: Bar Magnets, Deflection Magnetometer, Scale

PAPER STYLE For Semester -1and 2

1. B. Sc. Physics Syllabus for Semester 1 & 2 consists of 5 units:
2. All units carry 14 marks
3. 70 Marks for theory and 30 marks for Internal Examinations.
4. Total 5 questions one question from each unit.
5. Each question of 14 mark
6. Time duration: $2\frac{1}{2}$ Hours

Question:1 from Unit 1 : Mark 14

Question:2 from Unit 2 : Mark 14

Question:3 from Unit 3 : Mark 14

Question:4 from Unit 4 : Mark 14

Question:5 from Unit 5: Mark 14

Each Question divide in a,b,c and d sub question as shown below

(a) Shorts questions 4 [4 Marks]

(One word, one line, explanation, definition, true or false, fill up the blanks, etc.)

(b) Answer any 1 numerical out of 2 [2 Marks]

(c) Answer any1 out of 2 [3Marks], one question should be numerical

(d) Answer any1 out of 2 [5 Marks]