

21. To draw the BH curve of iron by using a Solenoid and to determine the energy loss due to Hysteresis.

Reference Books:--

1. Solid state Electronics Devices- B.G.Streetman (PHI)
2. Electronics Devices & Circuits ó A. Mottershead (PHI)
3. Integrated Electronicsô J.Millman ; C.Halkias (TMH)
4. Electronics Devices & circuits ó Sanjeev Gupta (Dhanpat Rai Pub.)
5. Electronics Devices & circuits-I & II ó Godse & Bakshi (Tech. Pub. , Pune)
6. Solid State Devices & Electronicsô Kamal Singh & S.P.Singh (S. Chand & Co.)
7. Electromagnetic theory and holography ó satya parakash
8. A text book of geology ó G.B. mahapatra
9. Engineering and general geology ó parbin singh.
10. The atmosphere ó Richard A. Anthes, Hans A. Panotsky, Jhon J Cahir, Albert Rango.
11. Relativityô Goyal and Gupta
12. Text book of Physics --- V. K. Sewane
13. Elements of Special theory of relativityô S.P.Singh and M.K.Bagde
14. A course in Electromagnetic field by S.W.Anwane, B.P.B. Publication, New Delhi.

4SPHY

Unit I : Geometrical optics and interference (12)

Cardinal points of an optical system, equivalent focal length and power of coaxial lens system, Interference in thin films due to reflected and transmitted light, interference in wedge shaped thin film, Newton's ring by reflected light, measurement of wavelength of monochromatic light by Newton's, ring, determination of refractive index of liquid by Newton's rings.

Unit II : Diffraction (12)

Fresnel and Fraunhofer Diffraction, Fresnel half period zone, zone plate construction and theory. Double slit diffraction,

Plane diffraction grating; construction and elementary theory, determination of wavelength of monochromatic light by using grating. Resolution of images, Rayleigh's criteria for resolution, R. P. of grating.

Unit III : Polarization (12)

Concept of polarization, optic axis, double refraction, polarization by double refraction, phase retardation plate :- Quarter wave plate, half wave plate, (Nicol prism-production and analysis of polarized light). Theory of production of elliptically and circularly polarized light, production and detection of elliptically and circularly polarized light. Half shade polarimeter, blue of the sky.

Unit IV : Laser (12)

Introduction to Maser, Absorption, spontaneous and stimulated emission, population inversion, pumping characteristics of laser beam. Main components of laser system, three level and four level laser system. Ruby laser, He-Ne laser, semiconductor laser, application of laser. Holography-principle .

Unit V : Fiber optics (12)

introduction of fiber optics, total internal reflection, structure and classification of optical fiber. Propagation of light wave in an optical fiber, Acceptance angle and

numerical aperture, dispersion, fiber losses, fiber optic communication. Advantages and Disadvantages of optic fibers, application of fiber optics.

Unit VI : Renewable Energy Sources (12)

Introduction to various renewable energy sources ó Solar energy, Wind energy, ocean energy- Waves & tides, geothermal energy, Hybrid Systems, Hydrogen energy systems, Fuel cells.

Solar energy - Solar radiations on earth - availability and seasonal variations, Solar constant, Spectral distribution, Measurement of solar radiation and sun shine.

Solar Energy Storage :- Methods of storage, properties of storage materials. Principle of Solar Thermal Applications, Solar water heater, Solar concentrating collectors - Types , applications.

Solar Photovoltaic systems -- Operating principle, Photovoltaic cell concepts , power of a solar cell and solar PV panel ; Applications.

Practical : The distribution of marks for practical examination will be as follows:

Record Book	10 marks
Viva-voce	10 marks
Experiment	20 marks
Assignment	10 marks
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Total	50 marks
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- A student will have to perform at least ten experiments per semester.
- The semester examination will be of Four Hour duration and student will have to perform one experiment in the semester examination.
- In assignment, every student should be asked to submit the detailed report on one of experiments he or she has performed. The detailed report should include the theoretical background of the experiment..

Evaluation of the student during the semester:

The teacher should explain, discuss and demonstrate one experiment per turn in the first twelve turns of the semester. At the same time in every turn; a teacher will have to conduct a test in the first period of the turn, based on the experiment; he or she has

explained in the previous turn. The test is to be carried out with the interest to make the student aware of the basics of the experiments. This will enhance the viva voce competence of the student. A record of these tests is to be maintained in the department duly signed by the teacher in-charge and head of the department. The record is to be maintained in the following format. Each assignment should be of at least 15 marks. Find the average and assign it in the end Semester practical examination.

Record of Marks scored in the assignments during the semester:-

Date											
Sr. No.	Name of the student	Expt1	Expt2	Expt 3	Expt 4	Expt 5	Expt 6	Expt7	Expt8	Expt9	Expt 10
1	ABC										
2	DEF										
3	OHI										
4	JKL										
Signature of the teacher incharge											

Once this part is over, actual experimentation work should begin. The date-wise record is to be maintained in the following format.

Date-wise Record of the experiments performed

Sr. No.	Name of the student	Expt1	Expt2	Expt 3	Expt 4	Expt 5	Expt 6	Expt7	Expt8	Expt9	Expt 10
1	ABC										
2	DEF										
3	GHI										
4	JKL										
Signature of the teacher incharge											

- Completion Certificate: is must for practical record book.
- The semester examination will be of Four Hour duration and the student will have to perform one experiment in the semester examination

Practicals :

- To determine the wavelength of monochromatic light by Newton's rings.
- To verify the Brewster's law.
- To determine the refractive indices for ordinary and extra-ordinary rays using double image prism.

4. To determine the Concentration of sugar solution by half shade polarimeter.
5. To determine the wavelength of monochromatic light by plane diffraction grating.
6. To find the number of lines per centimeter of the given grating.
7. To determine the resolving power of plane diffraction grating.
8. To determine the resolving power of telescope.
9. To determine the wavelength of laser light.
10. Determination of refractive index of a prism by spectrometer.
11. Determination of dispersive power of prism material
12. To determine the resolving power of prism.
13. study of interference of light by bi-prism experiment and find the wavelength of sodium light.
14. To verify the law of Malus of plane polarized light.
15. Polarplots of solarpanel
16. Measurement of direct radiation using Pyrheliometer .
17. Measurement of global & diffuse radiation using pyranometer
18. Determination of solar constant
19. To determine frequency and phase of signal using CRO.
20. To determine capacitance by Scherring bridge method.
21. To determine self inductance by bridge rectifier method.
22. To determine frequency of AC mains by Sonometer.
23. To study and plot I-V characteristics of solar cell.
24. To study time constant of an RC circuit experimentally and verify the result theoretically.
25. Verification of Stefan's law of radiation by using an incandescent lamp as black body Radiator.
26. To study (a) Half-wave Rectifier and (b) Full-wave Bridge Rectifier and investigate the effect of C, L and π filters.

REFERENCE BOOKS:

1. Laser and non-linear optics ó B B Laud.
2. Optoelectronics and fiber optics communication ó C.K Sarkar, D.C. Sarkar.
3. An introduction to fiber optics ó R. Allen Shotwell
4. Optics ó Ajoy Ghatak.
5. Optical fiber Communication ó John M. Senior
6. Principles of optics ó B.K.Mathur
7. Optics and laser ó V.K. Sewane

8. Optics and atomic physics ó D.P.Khandelwal.
9. Non Conventional Energy Sources, G. D. RAI(4th edition), Khanna Publishers, Delhi.
10. Solar Energy, S.P. Sukhatme (second edition), Tata Mc. Graw Hill Ltd, New Delhi.
11. Solar Energy Utilisation, G. D. RAI (5th edition), Khanna Publishers, Delhi.
12. Principles of Solar Energy - Kreith Kreider.
13. Renewable Energy - BentSarensen.

3. Chemistry

3S Chemistry

(Effective from session 2014-15)

The examination in Chemistry of Third semester shall comprise of one theory paper, internal assessment and practical examination. Theory paper will be of 3 Hrs. duration and carry 80 marks. The internal assessment will carry 20 marks. The practical examination will be of 6 hours duration and carry 50 marks.

The following syllabi is prescribed on the basis of six lectures per week and 6 practical periods per batch per week. Each theory paper has been divided into 6 units. There shall be one question in every unit with internal choice for each of 12 marks & one compulsory question covering all the syllabus of Semester-III (8 marks).

B.Sc. Part- II (Semester- III)

3S Chemistry

Total Lectures: 84

Marks: 80

Note: Figures to the right hand side indicate number of lectures.

Unit I

14L

A] Covalent Bonding:

Molecular Orbital Theory. Postulates of MO theory. LCAO approximation. Formation of bonding and antibonding MOs. Rules for LCAO. MO energy level diagram. Concept of bond order. MO structure of homonuclear diatomic molecules of namely He_2 , H_2 , N_2 and O_2 . Stability sequence of species of O_2 i.e. O_2 , O_2^+ , O_2^{2+} , O_2^- and O_2^{2-} . Paramagnetic nature of O_2 . MO structure of heteronuclear diatomic molecules viz. NO, HF and CO (Coulson's structure). Explanation of important properties of CO viz. - triple