

Reference Books :

- 1) T. M. Karade, M. S. Bendre :Lectures on Mechanics, Sonu-Nilu Publication, Nagpur.
- 2) H. Goldstein : Classical Mechanics (2nd edition), Narosa Publishing House, New Delhi.
- 3) S. L. Loney : Statics, Mc-Millan and co., London.
- 4) R. S. Verma : A Text Book on Statics, Pothishala Pvt. Ltd. , Allahabad.
- 5) S. L. Loney : An Elementary Treatise on the Dynamics of a particle and of rigid bodies, Cambridge University Press, 1956.
- 6) D. K. Daftari, V. N. Indurkar : Elements of Statics, Published by Dattsons, J. Neharu Marg, Nagpur.
- 7) M. A. Pathan : A modern Text Book of Statics, Pragati Prakashan, Nagpur.

2. PHYSICS

3S PHY

Unit I : Mathematical background and Electrostatics (12)

Gradient, divergence and curl of a vector fields and their physical significance, line surface and volume integral. Gauss divergence theorem , Stocks theorem. Work done on charge in electrostatic field, flux of electric field, force on moving charge, Lorentz force equation and definition of B. Ampere's force law, Ampere's Law and its applications.

Unit II : Magnetostatics and Maxwell's Equations (12)

Faraday's Law, Integral and differential form of Faraday's law, displacement current and Maxwell's Equation , wave Equation satisfied by E and B. Plane electromagnetic wave in vacuum, Poynting vector and Poynting theorem.

Unit-III : Solid State Electronics Devices-I – (12)

Physics of semiconductors : Introduction to semiconductors ; Charge carriers & electrical conduction through semiconductors ; Doping, extrinsic semiconductors ; Fermi level & energy level diagrams ; Drift current in

semiconductor , mobility, conductivity ; Hall effect, Hall coefficient, Semiconductor diode & its biasing, LED, Varactor diode.

Unit-IV : Solid State Electronics Devices-II – (12)

Introduction to BJT ; working of BJT ; modes of operation ; Current gains α and β , their relation ; CB & CE characteristics ; JFET- construction & working , characteristics of FET ; Basic concept of Difference amplifier, IC-OP AMP, electrical parameters of OP AMP, inverting & noninverting modes ; OP AMP as adder, subtractor, differentiator & integrator.

Unit: V : Special Theory of Relativity (12)

Postulates of Special Theory of Relativity, Lorentz transformations, Length contraction, Time dilation, relativistic addition of velocities, relativity of mass, Einstein's Mass - energy relation, Numericals.

Unit: VI : Atmosphere and Geophysics (12)

Structure of earth ó The crust, mantle, core.

Part of the earth ó As a planet; The Atmosphere, The lithosphere, The Hydrosphere Composition of Atmosphere

Earthquakes ó Causes, terminologies associated with earthquakes. Type of earthquakes scale of intensity, recording of earthquakes.

Radiation in the atmosphere, Propagation of energy through vacuum, Intensity of radiation, Scattering, absorption and reflection of solar radiation by the atmosphere. Moisture and clouds: mechanism that produces clouds , Cloud produced by mixing and by cooling.

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	GHI										
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

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

Experiments:-

- To determine characteristics of CB transistor
- To determine characteristics of CE transistor
- Measurement of magnetic field by Hall probe method
- To study variation of gain of CE amplifier with load
- To study Zener regulated power supply
- To determine characteristics of FET
- To study FET as a voltmeter
- To study Weins bridge oscillator
- To study phase shift oscillator
- To study Weinø bridge oscillator
- To study p-n diode as a rectifier
- To determine characteristics of p-n junction.
- Study of OPAMP as an inverting amplifier
- Study of OPAMP as noninverting amplifier
- Study of OP AMP as an adder
- Study of OP AMP as subtractor
- Study of OP AMP as differentiator
- Study of OP AMP as an integrator
- To determine characteristics of Phototransistor
- Measurement of field strength its variation in a solenoid.