

MONTHLY SYLLABUS

SESSION-2016-17

CLASS-XI

SUBJECT : PHYSICS (THEORY)

MONTH	CONTENTS
01.07.2016 to 08.07.2016	Orientation and Recapitulation : Discussion on importance of physics, scope of physics and other topic of interest.
11.07.2016 to 30.07.2016	<p>UNIT -I: PHYSICAL WORLD AND MEASUREMENTS</p> <p>Physics - Scope and excitement, nature of physical laws, physics Technology and Society, Need for Measurement, units of measurement, system of units, SI units, fundamental and derived units. Length, mass and time measurements, accuracy and precision of Measuring Instruments</p> <p>One experiment related to topics discussed in the week</p> <p>Errors in Measurements, significant figures. Dimensions of physical quantities, dimensional analysis and its applications.</p> <p>Exercise questions from NCERT & value based questions</p> <p>UNIT-II : KINEMATICS</p> <p>Frame of reference, Motion in a straight line. Position – time graph</p> <p>PSA practice</p> <p>One experiment related to topics discussed in the week</p> <p>Speed and velocity. Elementary concepts of differentiation and integration for describing Motion, Uniform and Non-uniform motion, average speed and instantaneous velocity. Uniformly accelerated motion. Velocity - time and position - time graphs, relation for uniformly accelerated motion (graphically treatment)</p>

	<p>One activity related to topics discussed in the week.</p> <p>Scalar and vector quantities, position and displacement vectors, general vectors and their notations, equality of vectors, Multiplication of vectors by real number, addition and subtraction of vectors. Relative velocity, unit vector, Resolution of vector in a plane, rectangular components, Scalar and vector product of vectors.</p> <p>PSA practice</p> <p>One experiment related to topics discussed in the week</p>
<p>01.08.2016 to 31.08.2016</p>	<p>Motion in a plane, Cases of uniform velocity and uniform acceleration, Projectile Motion, uniform circular Motion.</p> <p>Exercise questions from NCERT & value based questions</p> <p>UNIT-III: LAWS OF MOTION. Intuitive concept of force, inertia, Newton's first law of Motion,</p> <p>One experiment related to topics discussed in the week</p> <p>Momentum and Newton's second law of motion, Impulse, Newton's third law of motion. Laws of conservation of linear momentum and its application. Equilibrium of concurrent forces.</p> <p>PSA practice</p> <p>Static and kinetic friction, laws of friction, rolling friction, lubrication, and dynamics of uniform circular motion, Centripetal force, examples of circular motion (vehicles on level road, vehicles on banked road).</p> <p>Exercise questions from NCERT & value based questions</p> <p>One experiment related to topics discussed in the week</p> <p>YUVA Session - 3.1 Attitude is everything</p> <p>UNIT-IV: WORK, ENERGY AND POWER : Work done by a constant force and variable force, Kinetic energy, work energy theorem, Power, Notation of potential energy, potential energy</p>

	<p>of a spring.</p> <p>PSA practice</p> <p>One experiment related to topics discussed in the week</p> <p>Conservative forces, ‘conservation of mechanical energy (Kinetic and potential energies), Non conservative forces, motion in a vertical circle, Elastic and inelastic collisions in one and two dimensions.</p> <p>NCERT Exercise questions & value based questions</p> <p>One activity related to topics discussed in the week.</p>
01.09.2016 to 30.09.2016	<p>UNIT-V : MOTION OF SYSTEM OF PARTICLES AND RIGID BODY:</p> <p>Centre of mass of a two particle system, momentum, conservation and centre mass motion. Centre of mass of a rigid body, centre of mass of uniform rod, Moment of force, torque</p> <p>PSA practice</p> <p>One experiment related to topics discussed in the week</p> <p>Angular Momentum, law of Conservation of angular momentum and its applications, Equilibrium of rigid bodies, Rigid body rotation and equations of rotational motion. Comparison of linear and rotational motion.</p> <p>One experiment related to topics discussed in the week.</p>
	<p style="text-align: center;">REVISION FOR SA-I (EXAM)</p> <p style="text-align: center;">SA-I (EXAM)</p>
01.10.2016 to 31.10.2016	<p>Discussion of question paper -SA -I</p> <p>Moment of inertia, radius of gyration, values of moments of inertia for simple geometrical objects (no derivation). Statement of parallel and perpendicular axis theorems and their applications.</p>

	<p>NCERT Exercise questions.& value based questions</p> <p>YUVA Sessions.12-Towards Zero waste!</p> <p>UNIT-VI: GRAVITATION Kepler’s laws of planetary motion, the universal law of gravitation, acceleration due to gravity and its variation with altitude and depth, Gravitational potential energy, gravitational potential</p> <p>PSA practice</p> <p>One experiment related to topics discussed in the week</p>
<p>01.11.2016 to 30.11.2016</p>	<p>Escape velocity, orbital velocity of a satellite, geostationary satellites.</p> <p>NCERT Exercise questions & value based questions</p> <p>UNIT-VII: PROPERTIES OF BULK MATTER: Elastic behavior, stress and strain relationship, Hook’s Law, Young’s Modulus, bulk modulus, shears modulus, Poisson ratio, elastic energy</p> <p>Pressure due to a fluid column, Pascal’s Law and its applications (hydraulic lift and hydraulic brakes). Effect of gravity on fluid pressure. viscosity, Stoke’s Law, terminal velocity, streamline and turbulent flow, critical velocity. Bernoulli’s theorem.</p> <p>PSA practice</p> <p>One activity related to topics discussed in the week</p> <p>Applications of Bernoulli theorem, surface energy and surface tension, angle of contact, excess pressure, Application of surface tension ideas to drops, bubbles and capillary rise.</p> <p>PSA practice</p> <p>YUVA Session No. 3.7-Road Safety and us</p> <p>One experiment related to topics discussed in the week</p> <p>THERMAL PROPERTIES OF MATTER: Heat, temperature, thermal expansion, thermal expansion of solids,</p>

	<p>liquids and gases, anomalous expansion of water, specific heat capacity C_p, C_v. Calorimetry, change of state, latent heat capacity, heat transfer - conduction convection and radiation.</p> <p>NCERT Exercise questions & value based questions</p> <p>One experiment related to topics discussed in the week</p>
01.12.2016 to 31.12.2016	<p>Thermal conductivity, qualitative idea of black body radiation Wein's displacement Law. Stefan's law, Green house effect.</p> <p>NCERT Exercise questions. & value based questions</p> <p>UNIT -VIII: THERMODYNAMICS: Thermal equilibrium and definition of temperature, (Zeroth's Law, of thermodynamics) heat work, and internal energy.</p> <p>One activity related to topics discussed in the week</p> <p>First law of thermodynamics, Isothermal and Adiabatic process. second law of thermodynamics, reversible and irreversible processes heat engine and refrigerator..</p> <p>NCERT Exercise questions & value based questions</p> <p>One experiment related to topics discussed in the week</p> <p>UNIT-IX: BEHAVIOUR OF PERFECT GASES AND KINECTIC THEORY OF GASES: Equation of state of a perfect gas, work done in compressing a gas, kinetic theory of gases - assumptions, concept of pressure, kinetic interpretation of temperature, rms speed of gas molecules. Degrees of freedom, law of equi-partition of energy (statement only)and application to specific heats of gases, concept of mean free path, Avogadro's number.</p> <p>NCERT Exercise questions. & value based questions</p> <p>One activity related to topics discussed in the week</p> <p>UNIT-X : OSCILLATIONS AND WAVES : Periodic motion - time period, frequency, displacement as a function of time,</p>

	periodic functions.
01.01.2017 to 15.01.2017	WINTER VACATION
16.01.2017 to 31.01.2017	<p>Simple Harmonic Motion, and its equation, phase. Oscillations of spring-restoring force and force constant, energy in S.H.M - kinetic and potential energies.</p> <p>Simple pendulum - derivations of its time period, Free, forced and damped oscillations, (qualitative idea only) resonance</p> <p>NCERT Exercise questions. & value based questions</p> <p>One experiment related to topics discussed in the week</p> <p>Wave motion, longitudinal and transverse waves, speed of wave motion displacement relation for progressive waves</p> <p>Principle of superposition of waves</p> <p>One experiment related to topics discussed in the week</p>
01.02.2017 to 19.02.2017	<p>Reflection of waves, standing waves in strings and organ pipes, fundamental mode and harmonics, beats, Doppler effect.</p> <p>NCERT Exercise questions & value based questions</p> <p style="text-align: center;">REVISION AND PRACTICE FROM SUPPORT MATERIAL</p>
20.02.2017 to 31.03.2017	ANNUAL EXAM AND RESULTS

CLASS - XI (PHYSICS) 2016-17

LIST OF PRACTICALS

The record, to be submitted by the students, at the time of their annual examination, has to include:

- Record of at least 15 Experiments (with a minimum of 8 from section A and 7 from section B) to be performed by the students.
- Record of at least 5 Activities (with a minimum of 2 each from section A and section B), to be performed by the students.
- Report of the project to be carried out by the students

SECTION- A

Experiments

(Any 8 experiments out of the following to be performed by the Students)

1. To measure diameter of a small spherical/cylindrical body and to measure internal diameter and depth of a given beaker/calorimeter using Vernier Callipers and hence find its volume.
2. To measure diameter of a given wire and thickness of a given sheet using screw gauge.
3. To determine volume of an irregular lamina using screw gauge.
4. To determine radius of curvature of a given spherical surface by a spherometer.
5. To determine the mass of two different objects using a beam balance.
6. To find the weight of a given body using parallelogram law of vectors.
7. Using a simple pendulum, plot L-T and L-T² graphs. Hence find the effective length of second's pendulum using appropriate graph.
8. To study variation of time period of a simple pendulum by changing its length and taking bobs of different masses independently and interpret the result.

9. To study the relationship between force of limiting friction and normal reaction and to find the coefficient of friction between a block and a horizontal surface.
10. To find the downward force, along an inclined plane, acting on a roller due to gravitational pull of the earth and study its relationship with the angle of inclination (θ) by plotting graph between force and $\sin \theta$.

Activities

1. To make a paper scale of given least count, e.g., 0.2cm, 0.5 cm.
2. To determine mass of a given body using a metre scale by principle of moments.
3. To plot a graph for a given set of data, with proper choice of scales and error bars.
4. To measure the force of limiting friction for rolling of a roller on a horizontal plane.
5. To study the variation in range of a Projectile with angle of projection.
6. To study the conservation of energy of a ball rolling down on an inclined plane (using a double inclined plane)
7. To study dissipation of energy of a simple pendulum by plotting a graph between square of amplitude and time.

SECTION-B

Experiments

(Any 7 experiments out of the following to be performed by the students)

1. To determine Young's modulus of elasticity of the material of a given wire.
2. To find the force constant of a helical spring by plotting a graph between load and extension.
3. To study the variation in volume with pressure for a sample of air at constant temperature by plotting graphs between P and V, and between P and $1/v$.
4. To determine the surface tension of water by capillary rise method.

5. To determine the coefficient of viscosity of a given viscous liquid by measuring terminal velocity of a given spherical body.
6. To study the relationship between the temperature of a hot body and time by plotting a cooling curve.
7. To determine specific heat capacity of a given (i) solid, (ii) liquid, by method of mixtures.
8. To study the relation between frequency and length of a given wire under constant tension using sonometer.

OR

To study the relation between the length of a given wire and tension for constant frequency using sonometer.

9. To find the speed of sound in air at room temperature using a resonance tube by two resonance positions

Activities

1. To observe change of state and plot a cooling curve for molten wax.
2. To observe and explain the effect of heating on a bi-metallic strip.
3. To note the change in level of liquid in a-container on heating and interpret the observations.
4. To study the effect of detergent on surface, tension of water by observing capillary rise.
5. To study the factors affecting the rate of loss of heat of a liquid.
6. To study the effect of load on depression of a suitably clamped metre scale loaded at (i) its end (ii) in the middle.
7. To observe the decrease in pressure with increase in velocity of a fluid.

Evaluation scheme for practical Examination 2016

Total Marks - 30

3 Hours

Two Experiments one from each section	8+8 marks
Practical record (Experiments & activities)	6 marks
Investigatory Project	3 marks
Viva on experiments, activities and Project	5 marks
Total	30 marks

TEAM MEMBERS

1. Mr. Devinder Kumar, PGT-Physics, RPVV Kishan Ganj, Delhi.
2. Mr. Jile Singh, PGT-Physics, RPVV Civil Lines, Delhi.