

**TERM WISE SYLLABUS**

**SESSION-2018-19**

**CLASS-XI**

**SUBJECT: PHYSICS**

**MID TERM**

<b>MONTH</b>	<b>CONTENTS</b>
<b>April 2018 To September 2018</b>	<p><b>UNIT -I: PHYSICAL WORLD AND MEASUREMENT</b></p> <p><b>Chapter-1 : Physical World</b> Physics - Scope and excitement, nature of physical laws, Physics Technology and Society.</p> <p><b>Chapter-2 : Units and Measurements</b> 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; errors in measurement, significant figures. Dimensions of physical quantities, dimensional analysis and its applications.</p> <p><b>UNIT-II : KINEMATICS</b></p> <p><b>Chapter-3 : Motion in a Straight Line</b> Frame of reference, Motion in a straight line. Position – time graph, 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.</p>

Velocity - time and position - time graphs, Relations for uniformly accelerated motion (graphically treatment)

#### **Chapter-4 : Motion in a Plane**

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. Motion in a plane, Cases of uniform velocity and uniform acceleration, Projectile Motion, uniform circular Motion.

- Exercise questions from NCERT
- Experiment related to topic
- Activity related to topic
- PSA Practice and

#### **UNIT-III : LAWS OF MOTION**

##### **Chapter-5 : Laws of Motion**

Intuitive concept of force; Inertia; Newton's first law of motion; momentum and Newton's second law of motion; impulse; Newton's third law of motion.

Law of conservation of linear momentum and its applications.

Equilibrium of concurrent forces; Static and kinetic friction; laws of friction; rolling friction; lubrication.

Dynamics of uniform circular motion: Centripetal force, examples of circular motion (vehicles on a level circular road, vehicle on a banked road).

## **UNIT-IV : WORK, ENERGY AND POWER**

### **Chapter-6 : Work, Energy and Power**

Work done by a constant force and a variable force; kinetic energy; work-energy theorem; power.

Notion of potential energy, potential energy of a spring; conservation 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.

- Exercise questions from NCERT
- Experiment related to topic
- Activity related topic
- PSA Practice
- YUVA Session – 3.1 Attitude is everything.

## **UNIT-V : MOTION OF SYSTEM OF PARTICLES AND RIGID BODY**

### **Chapter-7 : System of Particles and Rotational Motion**

Centre of mass of a two-particle system; momentum conservation and centres of mass motion. Centres of mass of a rigid body; centres of mass of a uniform rod.

### **REVISION FOR MID TERM EXAM**

- Exercise question from NCERT
- Experiment related to topic
- Activity related to topic
- PSA Practice

<p><b>OCTOBER</b> <b>2018 TO</b> <b>JANUARY</b> <b>2019</b></p>	<p style="text-align: center;"><b>SECOND TERM</b></p> <p><b>Discussion of question paper of First Term</b></p> <p>Moment of a force; torque; angular momentum; law of conservation of angular momentum and its applications.</p> <p>Equilibrium or rigid bodies; rigid body rotation and equations of rotational motion; comparison of linear and rotational motions.</p> <p>Moment of inertia; radius of gyration; values of moments of inertia for simple geometrical objects (no derivation). Statement or parallel and perpendicular axes theorems and their applications.</p> <p><b>UNIT-VI : GRAVITATION</b></p> <p><b>Chapter-8 : Gravitation</b></p> <p>Kepler’s laws of planetary motion, universal law of gravitation. Acceleration due to gravity and its variation with altitude and depth.</p> <ul style="list-style-type: none"> <li>• Exercise questions from NCERT</li> <li>• Experiment related to topic</li> <li>• Activity related to topic</li> <li>• PSA Practice</li> </ul> <hr/> <p>Gravitational potential energy and gravitational potential; escape velocity orbital velocity of a satellite; Geo-stationary satellites.</p> <p><b>UNIT-VII : PROPERTIES OF BULK MATTER</b></p> <p><b>Chapter-9 : Mechanical Properties of Solids</b></p> <p>Elastic behavior; Stress-strain relationship; Hooke’s law;</p>
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Young's modulus; bulk modulus; shear modulus of rigidity; Poisson's ratio; elastic energy.

### **Chapter-10 : Mechanical Properties of Fluids**

Pressure due to fluid column; Pascal's law and its applications (hydraulic lift and hydraulic brakes); effect of gravity on fluid pressure.

Viscosity; Stokes' law; terminal velocity; streamline and turbulent flow; critical velocity; Bernoulli's theorem and its applications.

Surface energy and surface tension; angle of contact; excess of pressure across a curved surface; application of surface tension ideas to drops, bubbles and capillary rise.

### **Chapter-11 : Thermal Properties of Matter**

Heat; temperature; thermal expansion; thermal expansion of solids, liquids and gases; anomalous expansion of water; specific heat capacity;  $C_p$ ,  $C_v$  – calorimetry; change of state – latent heat capacity.

- Exercise questions from NCERT
- Experiment related to topic
- Activity related to topic
- PSA Practice
- YUVA Session No. 3,7 Road Safety and us

Heat transfer-conduction, convection and radiation; thermal conductivity; qualitative ideas of Blackbody radiation; Wein's displacement Law; Stefan's Law; Green house effect.

### **UNIT-VIII : THERMODYNAMICS**

## **Chapter-12 : Thermodynamics**

Thermal equilibrium and definition of temperature (zeroth law of thermodynamics); heat, work and internal energy. First law of thermodynamics; isothermal and adiabatic processes.

Second law of thermodynamics: reversible and irreversible processes; Heat engine and refrigerator.

## **UNIT-IX : BEHAVIOUR OF PERFECT GASES AND KINETIC THEORY OF GASES**

### **Chapter-13 : Kinetic Theory**

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 heat capacities of gases; concept of mean free path, Avogadro's number.

## **UNIT-X : Mechanical Waves and Ray Optics**

### **Chapter-14: Oscillations and Waves**

Periodic motion - time period, frequency, displacement as a function of time, periodic functions. Simple harmonic motion (S.H.M) and its equation; phase; oscillations of a loaded spring-restoring force and force constant; energy in S.H.M. Kinetic and potential energies; simple pendulum derivation of expression for its time period.

Free, forced and damped oscillations (qualitative ideas only), resonance.

**Wave motion:** Transverse and longitudinal waves, speed of

	<p>wave motion, displacement relation for a progressive wave, principle of superposition of waves, reflection of waves, standing waves in strings and organ pipes, fundamental mode and harmonics, Beats, Doppler effect.</p> <ul style="list-style-type: none"> <li>• Exercise questions from NCERT.</li> <li>• Experiment related to topic</li> <li>• Activity related to topic</li> </ul>
	<p><b>WINTER VACATION</b></p>
	<p><b>Chapter-15: RAY OPTICS</b></p> <p>Ray Optics: Reflection of light, spherical mirrors, mirror formula, refraction of light, total internal reflection and its applications, optical fibres, refraction at spherical surfaces, lenses, thin lens formula, lensmaker's formula, magnification, power of a lens, combination of thin lenses in contact, refraction and dispersion of light through a prism.</p> <p>Scattering of light - blue colour of sky and reddish appearance of the sun at sunrise and sunset.</p> <p>Optical instruments: Microscopes and astronomical telescopes (reflecting and refracting) and their magnifying powers</p> <ul style="list-style-type: none"> <li>• Exercise questions from NCERT.</li> <li>• Experiment related to topic</li> <li>• Activity related to topic</li> </ul>
	<p>Reflection of waves, standing waves in strings and organ pipes, fundamental mode and harmonics, beats, Doppler effect.</p> <p><b>NOTE-SYLLABUS MUST BE COMPLETED BY 31<sup>ST</sup> JANUARY</b></p>
<p><b>February</b></p>	<p><b>NCERT Exercise questions</b></p>

<b>2019</b>	<b>REVISION AND PRACTICE FROM SUPPORT MATERIAL</b> <b>NOTE :- FIRST TERM SYLLABUS IS ALSO COVERED IN ANNUAL EXAMINATION</b>
<b>March 2019</b>	<b>ANNUAL EXAM</b>

## CLASS - XI (PHYSICS) 2018-19

### 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 6 from each section), 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

### EVALUATION SCHEME

**Time Allowed : Three hours**

**Max. Marks: 30**

Two experiments one from each section	8+8 Marks
Practical record (experiment and activities)	6 Marks
Investigatory Project	3 Marks
Viva on experiments, activities and project	5 Marks
<b>Total</b>	<b>30 Marks</b>



## **SECTION- A**

### **Experiments**

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 its  $L-T^2$  graphs and use it to find the effective length of second's pendulum.
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 ( $\theta$ ) by plotting graph between force and  $\sin \theta$ .

### **Activities**

**(for the purpose of demonstration only)**

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**

1. To determine Young's modulus of elasticity of the material of a given wire.

2. To determine the surface tension of water by capillary rise method.
3. To determine the coefficient of viscosity of a given viscous liquid by measuring terminal velocity of a given spherical body.
4. To determine specific heat capacity of a given (i) solid, (ii) liquid, by method of mixtures.
- 5.a) To study the relation between frequency and length of a given wire under constant tension using sonometer.  
b) To study the relation between the length of a given wire and tension for constant frequency using sonometer.
6. To find the speed of sound in air at room temperature using a resonance tube by two resonance positions.
7. To find the value of  $v$  for different values of  $u$  in case of a concave mirror and to find the focal length.
8. To find the focal length of a convex lens by plotting graphs between  $u$  and  $v$  or between  $1/u$  and  $1/v$ .
9. To determine angle of minimum deviation for a given prism by plotting a graph between angle of incidence and angle of deviation.
10. To determine refractive index of a glass slab using a travelling microscope.

### **Activities**

**(for the purpose of demonstration only)**

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.
8. To observe refraction and lateral deviation of a beam of light incident obliquely on a glass slab.
9. To study the nature and size of the image formed by a (i) convex lens, (ii) concave mirror, on a screen by using a candle and a screen (for different distances of the candle from the lens/mirror).
10. To obtain a lens combination with the specified focal length by using two lenses from the given set of lenses.