

# **Physics**

## **Class- XI & XII**

### **Rationale**

The purpose of this review of plus one & plus two syllabi is to reduce burden in minds of the students without sacrificing the required linkages between different topics.

As after completing Plus two level a Science student has to compete at national level to get entry into various professional courses, so we have added as much content matter as was necessary. We have also re-organise the subject matter so that different topics related to a broad field are studied under one head.

### **Objectives**

The attempt of present syllabus at the Senior Secondary level is to :-

1. Develop conceptual competence in the learners so as to cope up with professional courses in future.
2. Strengthen the concepts developed at the secondary stage to provide foundation for further learning the subject at tertiary level more effectively.
3. Provide exposure to the learners in different processes used in Physics related industrial and technological applications.
4. Provide atmosphere to develop process, experimental observational, manipulative, decisions making and investigatory skills in the learners.
5. Develop interest in learners for further study of subject as a discipline by promoting problem-solving abilities and creative thinking.
6. Underline the relationship between nature and matter on scientific basis develop positive scientific attitude and appreciate the contribution to Physics towards the improvement of quality of life and human welfare.
7. Shift teaching from teacher centric to learner centric as they can experience/feel Physics through activities planned by teacher. Also

through the listed activities situations will be created in which learning will grow, evolve and refine.

**Evaluation**  
**(Style of Question Paper)**

**For Classes 10+1 & 10+2 in**

**Theory**

Part-I

Time = 3 Hrs.

Maximum No. of Questions = 30

Max. Marks = 70

Question No. 01 – 07, each of 01 Mark;  $7 \times 1 = 07$  Marks

Question No. 08 – 19, each of 02 Marks;  $12 \times 2 = 24$  Marks

Question No. 20 – 27, each of 03 Marks;  $8 \times 3 = 24$  Marks

Question No. 28 – 30, each of 05 Marks;  $3 \times 5 = 15$  Marks

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Total Questions = 30

Total Marks = 70  
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**Note**

1. In order to check copying, Questions having “One-Word answers” should be avoided.
2. Questions of 2 and 3 Marks should be so structured that even if a student partially attempts the questions, he may get some marks.
3. Numerical problems should carry 20% to 25% weightage of Marks (i.e. Approx. – 15 Marks) positively.

## Practicals

Part-II

Time = 3 Hrs.

Max. Marks = 30

* One experiment from either section	=	07 Marks
* Two activities one from each section, 2x3½	=	07 Marks
* One Investigatory project	=	05 Marks
* Viva	=	05 Marks
* Laboratory Records	=	06 Marks

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Total Marks = 30 Marks

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**Total Marks of Physics for 10+1 & 10+2 Classes, (70+30) = 100**

**Theory = 70, Practical = 30.**

## Evaluation

### Unit Wise Distribution of Marks

**Physics**

**Class – 10+1**

**Paper - Theory**

Unit	Topic	Marks
I	Physical World and Measurement	5
II	Kinematics	7
III	Laws of Motion	6
IV	Work, Power & Energy	8
V	Motion of System of Particles and Rigid Body	7
VI	Gravitation	5
VII	Properties of Bulk Matter	8
VIII	Behaviour of Perfect Gas and Kinetic Theory	6
IX	Thermodynamics	6
X	Oscillations and Waves	12
	TOTAL MARKS	70

## Evaluation

### Unit Wise Distribution of Marks

Physics

Class – 10+2

Paper - Theory

Unit	Topic	Marks
I	Electrostatics	8
II	Current Electricity	6
III	Magnetic Effects of Currents and Magnetism	8
IV	Electromagnetic Induction & Alternatic Current	8
V	Electromagnetic Waves	3
VI	Optics	13
VII	Dual Nature of Matter & Radiations	5
VIII	Atoms and Nuclei	7
IX	Electronic Devices	7
X	Communication Systems	5
	TOTAL MARKS	70

## **Expected Outcome**

After completing the Physics course at Senior Secondary stage (Ten Plus Two) a student would :

1. be able to acquire scientific temperament.
2. be able to think independently and will develop enough motivation to become a self learner.
3. be sensitive and receptive to scientific events and phenomena happening around him.
4. be able to acquire sound knowledge in science and to pursue into further.
5. be capable to viewing science as some thing happening around rather than embaded in the theoretical narrative of text books.
6. have sound mathematical base to take Physics as a specialized course such as honours course at degree level.
7. have a broad knowledge of technical/scientific vocabulary that he can understand any literature where such words are used.
8. have basic knowledge for carrying out experiments according to scientific methodology.

## Physics – Practical

### Class- XI

#### Section – A

#### EXPERIMENTS

1. Use of Vernier Callipers :
  - i). To measure diameter of a small spherical/cylindrical body.
  - ii). To measure dimensions of a given regular body of known mass and hence find its density.
  - iii). To measure internal diameter & depth of a given beaker/calorimeter and hence find its volume.
  
2. Use of Screw –Gauge :
  - (i) To measure diameter of a give wire.
  - (ii) To measure thickness of a given sheet.
  
3. Use of Spherometer :

To measure thickness of a given sheet.
  
4. To determine the mass of give body using :
  - (i) a metre scale.
  - (ii) a physical balance.
  
5. To find the weight of a given body using parallelogram law of vectors.
  
6. Using a simple pendulum :
  - (i) Plot  $L-T^2$  graph.
  - (ii) Hence find acceleration due to gravity.
  
7. To study the relationship between the force of limiting friction and normal reaction and hence find the coefficient of friction between a block and a horizontal surface.

## ACTIVITIES

1. To make a paper scale of given best count i.e. 0.2 cm, 0.5 cm.
2. To find the least count of a given apparatus/gadget/device (Burette, thermometer, stop watch, measuring tape etc.) and take one measurement.
3. To plot a graph for a given set of data with proper choice of scales and error bars.
4. To measure the force limiting friction for rolling of a roller on a horizontal surface.
5. To study the variation in the range of a jet of water with the angle of projection.
6. To study the conservation of energy of a ball rolling down on inclined plane (using a double inclined plane).
7. To study collision of two ball in two dimensions.
8. To study classification 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 the material of a given wire using searle's apparatus.
2. To find the spring constant for a helical spring by method of oscillation using three different masses.
3. To find the spring constant of a helical spring from the load extension graph.
4. To determine the surface tension of water by Capillary rise method using a travelling microscope.
5. To measure the co-efficient 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 body and time as it cools.
7. (i) To study the relation between frequency and length of a given wire under constant tension using Sonometer (Plot a graph between  $n$  and  $1/L$ ).  
(ii) To study the relation between length of given wire and tension of constant frequency using sonometer (Plot between  $n$  &  $1/L$ ).
8. To find the velocity of sound in air at room temperature using a resonance tube position method.
9. To determine the heat capacity of a given :  
(i) Solid                      (ii) Liquid by mixtures.

### **ACTIVITIES**

1. To find the atmospheric pressure using Forlin's Barometer
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 by observing capillary rise.
5. To study the factors affecting the rate of loss of heat of a liquid.

**Physics**  
**Class - XI**

**Suggested Investigatory Projects**

1. To investigate whether the energy of simple pendulum is conserved.
2. To determine the radius of gyration about center of mass of a meter scale used as a bar pendulum.
3. To investigate change in the velocity of the body under the action of a constant force and determine its acceleration.
4. To compare effectiveness of different materials as observers of sound.
5. To compare the Young's modulus of elasticity of different specimen of rubber and also draw their elastic hysteresis curve.
6. To study collision of two balls in two dimensions.

**Note :The teacher concerned can further include more investigating projects as per the local needs and availability of equipments.**

## **Physics – Practical**

### **Class - XII**

#### **Section – A**

#### **EXPERIMENTS**

1. To establish current-voltage relationship (Ohm's law) for a metallic conductor and find its resistance per Cm.
2. To find resistance of a given wire using meter bridge and hence determine the specific resistance of its material.
3. To verify the law of combination (Series/Parallel) or resistances using a meter bridge.
4. To compare the emf's of two given primary cells using potentiometer.
5. To determine internal resistance of given primary cell using Potentiometer.
6. To determine resistance of a Galvanometer by half-deflection method and find its figure of merit.
7. To convert the given Galvanometer (of known resistance) into an ammeter, voltmeter of desired range and to verify the same.
8. To find the frequency of the a/c mains with a sonometer.

#### **ACTIVITIES**

1. To measure the resistance and impedance of an inductor with or without iron core.
2. To measure resistance, voltage (AC/DC), current (AC) and check continuity of a given circuit using multimeter.
3. To assemble a house hold circuit comprising three bulbs, three (On/Off) switches, a fuse and a power source.
4. To assemble the components of a given electrical circuit.
5. To study the variation in potential drop with length of a wire for a steady current.

6. To draw the diagram of a given open circuit comprising at least a battery, resistor/Rheostate, key, ammeter and voltmeter. Mark the components that are not connected in proper order and correct the circuit and also the circuit diagram.

### **Section - B**

#### **EXPERIMENTS**

1. To find the value of  $V$  for different values of  $U$  in case of a concave mirror and to find focal length.
2. To find the focal length of a convex lens by plotting a graph between  $u$  &  $V$  or between  $1/u$  &  $1/v$ .
3. To find the focal length of Convex mirror using a convex lens.
4. To find the focal length of concave lens, using a convex lens
5. To determine angle of minimum deviation for a given prism by plotting a graph between the angle of incidence and the angle of deviation.
6. To determine refractive index of a glass slab using a traveling microscope.
7. To find the refractive index of a liquid by using (1) Concave mirror (2) Convex lens and plane mirror.
8. To draw the I-V characteristics curves of a p-n junction in forward bias and reverse bias.
9. To draw the characteristics curves of a zener diode and to determine its reverse break down voltage.
10. To study the characteristics of a common emitter NPN or PNP transistor and to find out the values of current and voltage gains.

#### **ACTIVITIES**

1. To study effect of intensity of light (by varying distance of the source) on an light, Dependent resistor (LDR).
2. To identify a diode, a LED, a transistor, an IC, a resister, a capacitor from mixed collections of such items.
3. Use a multimeter to :
  - (a) Identify base of transistor.
  - (b) Distinguish between NPN & PNP type of transistors.

- (c) See the unidirectional flow of current in case of a diode and a LED.
  - (d) Check whether a given electronic component (i.e. diode, transistor or IC) is in working order.
4. To observe refraction and lateral deviation of a beam of light incident on a glass slab.
  5. To observe polarization of light using two polaroids.
  6. To observe diffraction of light due to this slit between sharp edges of razor blades.
  7. To study the nature and size of the image formed by a convex lens using a candle and a screen (for different distance of the candle from the lens).
  8. To study the nature and size of the image of a candle formed by a concave mirror on a screen.

**Physics**  
**Class - XII**

**Suggested Investigatory Projects**

1. To compare effectiveness of different materials as insulators of heat.
2. To determine the wavelength of laser beam by diffraction.
3. To study the various factors on which the internal resistance/e.m.f. of a cell depends.
4. To construct a time switch and study dependence of its time constant on various factors.
5. To study infrared radiations emitted by different sources using photo transistor.
6. To design an automatic traffic signal system using suitable combination of logic gates.
7. To study lumenosity of various electric lamps of different power and make.
8. To study frequency response of :
  - (i) a resistor, an inductor and a capacitor
  - (ii) LR circuit.
  - (iii) CR Circuit.
  - (iv) LCR Series circuit.

**Note :** The teacher concerned can further include more investigatory projects as per the local needs and availability of equipments.