**PHYSICS (042)**

**Class XI**

**Term-I**

**Practical course structure**

Two experiments one from each section 8 Marks

Practical record (experiment and activities) 2 Marks

Viva on experiments, and activities 5 Marks

**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.

OR

To determine volume of an irregular lamina using screw gauge.

1. To determine radius of curvature of a given spherical surface by a spherometer.
2. To determine the mass of two different objects using a beam balance.
3. To find the weight of a given body using parallelogram law of vectors.
4. Using a simple pendulum, plot its L-T graph and use it to find the effective length of second's pendulum.

OR

To study variation of time period of a simple pendulum of a given length by taking bobs of same size but different masses and interpret the result.

1. To study the relationship between force of limiting friction and normal reaction and to find the co- efficient of friction between a block and a horizontal surface.

OR

1. 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 θ.

**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.

**PHYSICS (042)**

**Class XI**

**Term-II**

**Practical course structure**

Two experiments one from each section 8 Marks

Practical record (experiment and activities) 2 Marks

Viva on experiments, and activities 5 Marks

**Experiments**

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

OR

To find the force constant of a helical spring by plotting a graph between load and extension.

1. 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.
2. To determine the surface tension of water by capillary rise method.

OR

To determine the coefficient of viscosity of a given viscous liquid by measuring terminal velocity of a given spherical body.

1. To study the relationship between the temperature of a hot body and time by plotting a cooling curve.
2. To determine specific heat capacity of a given solid by method of mixtures.
3. 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.

1. 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

**PHYSICS (042)**

**Class XII**

**Term-I**

**Practical course structure**

Two experiments to be performed by students at time of examination 8 marks

Practical record [experiments and activities] 2 marks

Viva on experiments, and activities 5 marks

**Experiments**

1. To determine resistivity of two / three wires by plotting a graph between potential difference versus current.
2. To find resistance of a given wire / standard resistor using metre bridge.

OR

To verify the laws of combination (series) of resistances using a metre bridge.

OR

To verify the laws of combination (parallel) of resistances using a metre bridge.

1. To compare the EMF of two given primary cells using potentiometer.

OR

To determine the internal resistance of given primary cell using potentiometer.

1. To determine resistance of a galvanometer by half-deflection method and to find its figure of merit.
2. To convert the given galvanometer (of known resistance and figure of merit) into a voltmeter of desired range and to verify the same.

OR

To convert the given galvanometer (of known resistance and figure of merit) into an ammeter of desired range and to verify the same.

1. To find the frequency of AC mains with a sonometer.

**Activities assigned for Term I**

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 household 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/rheostat, key, ammeter and voltmeter. Mark the components that are not connected in proper order and correct the circuit and also the circuit diagram.

**PHYSICS (042)**

**Class XII**

**Term-II**

**Practical course structure**

Two experiments 8 marks

Practical record [experiments and activities] 2 marks

Viva on experiments, and activities 5 marks

**Experiments**

1. To find the focal length of a convex lens by plotting graphs between u and v or between 1/u and1/v.
2. To find the focal length of a convex mirror, using a convex lens.

OR

To find the focal length of a concave lens, using a convex lens.

1. To determine angle of minimum deviation for a given prism by plotting a graph between angle of incidence and angle of deviation.
2. To determine refractive index of a glass slab using a travelling microscope.
3. To find refractive index of a liquid by using convex lens and plane mirror.
4. To draw the I-V characteristic curve for a p-n junction diode in forward bias and reverse bias.

**Activities assigned for Term-II**

1. To identify a diode, an LED, a resistor and a capacitor from a mixed collection of such items.
2. Use of multi-meter to see the unidirectional flow of current in case of a diode and an LED and check whether a given electronic component (e.g., diode) is in working order.
3. To study effect of intensity of light (by varying distance of the source) on an LDR.
4. To observe refraction and lateral deviation of a beam of light incident obliquely on a glass slab.
5. To observe polarization of light using two Polaroids.
6. To observe diffraction of light due to a thin slit.
7. 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).
8. To obtain a lens combination with the specified focal length by using two lenses from the given set of lenses.

**CHEMISTRY (043)**

**Class XI**

**Term-I**

**Evaluation Scheme**

1. Volumetric Analysis 8 Marks

2. Content Based experiment 2 Marks

3. Class record and viva(Internal Examiner) 5 Marks

*Micro-chemical methods are available for several of the practical experiments, wherever possible such techniques should be used.*

**A. Basic Laboratory Techniques**

1. Cutting glass tube and glass rod

2. Bending a glass tube

3. Drawing out a glass jet

4. Boring a cork

**B. Characterization of Chemical Substances (2 Marks)**

1. Determination of melting point of an organic compound.

2. Determination of boiling point of an organic compound.

**C. Quantitative Estimation (8 marks)**

1. Using a mechanical balance/electronic balance.
2. Preparation of standard solution of Oxalic acid.
3. Determination of strength of a given solution of Sodium hydroxide by titrating it against standard solution of Oxalic acid.
4. Preparation of standard solution of Sodium carbonate.
5. Determination of strength of a given solution of hydrochloric acid by titrating it against standard Sodium Carbonate solution.

**Term-II**

**Evaluation Scheme**

1. Salt Analysis 8 Marks

2. Content Based Experiment 2 Marks

3. Project Work and Viva (Internal) 5 Marks

**A. Qualitative Analysis(8 Marks)**

1. Determination of one anion and one cation in a given salt **Cations**

Pb2+, Cu2+, As3+, Al3+, Fe3+, Mn2+, Ni2+, Zn2+, Co2+, Ca2+, Sr2+, Ba2+, Mg2+, NH4+

**Anions**

(CO3)2-, S2-, NO2-, SO32-, SO42-, NO3-, Cl-, Br-, I-, PO43-, C2O42- ,CH3COO-

(Note: Insoluble salts excluded)

1. Detection of -Nitrogen, Sulphur, Chlorine in organic compounds.

**B. Crystallization of impure sample of any one of the following:**

Alum, Copper Sulphate, Benzoic Acid. (Marks 2)

*PROJECTS scientific investigations involving laboratory testing and collecting information from other sources*

**CHEMISTRY (043)**

**Class XII**

**Term-I**

**Evaluation Scheme**

1. Volumetric Analysis 4 Marks

2. Salt Analysis 4 Marks

3. Content Based experiment 2 Marks

4. Class record and viva (Internal Examiner) 5 Marks

1. **Volumetric analysis (4 marks)**

Determination of concentration/ molarity of KMnO4 solution by titrating it against a standard solution of:

1. Oxalic acid,
2. Ferrous Ammonium Sulphate

*(Students will be required to prepare standard solutions by weighing themselves).*

1. **Salt analysis (Qualitative analysis) (4 marks)**

Determination of one cation and one anion in a given salt.

**Cations**

Pb2+, Cu2+, As3+, Al3+, Fe3+, Mn2+, Ni2+, Zn2+, Co2+, Ca2+, Sr2+, Ba2+, Mg2+, NH4+

**Anions**

(CO3)2-, S2-, NO2-, SO32-, SO42-, NO3-, Cl-, Br-, I-, PO43- , C2O42, CH3COO-

(Note: Insoluble salts excluded)

**3. Content Based Experiments (2 marks)**

A. Chromatography

1. Separation of pigments from extracts of leaves and flowers by paper chromatography and determination of Rf values.
2. Separation of constituents present in an inorganic mixture containing two cations only (constituents having large difference in Rf values to be provided).
3. Characteristic tests of carbohydrates, fats and proteins in pure samples and their detection in given foodstuffs.

**Term-II**

**Evaluation Scheme**

1. Volumetric Analysis 4 Marks

2. Salt Analysis 4 Marks

3. Content Based experiment 2 Marks

4. Class record and viva (Internal Examiner) 5 Marks

1. **Volumetric analysis (4 marks)**

Determination of concentration/ molarity of KMnO4 solution by titrating it against a standard solution of:

1. Oxalic acid,
2. Ferrous Ammonium Sulphate

*(Students will be required to prepare standard solutions by weighing themselves).*

**2) Salt analysis (Qualitative analysis) (4 marks)**

Determination of one cation and one anion in a given salt.

Cations- Pb2+, Cu2+, As3+, Al3+, Fe3+, Mn2+, Ni2+, Zn2+, Co2+, Ca2+, Sr2+, Ba2+, Mg2+, NH4+

Anions

(CO3)2-, S2-, NO2-, SO32-, SO42-, NO3-, Cl-, Br-, I, PO43,C2O42, CH3COO-

(Note: Insoluble salts excluded)

**3. Content based experiment**

A. Preparation of Inorganic Compounds

Preparation of double salt of Ferrous Ammonium Sulphate or Potash Alum.

Preparation of Potassium Ferric Oxalate.

B. Tests for the functional groups present in organic compounds:

Unsaturation, alcoholic, phenolic, aldehydic, ketonic, carboxylic and amino (Primary) groups.

**BIOLOGY (Code No. 044)**

**Class XI**

**A: List of Experiments**

**TERM -I**

1. Study and describe a locally available common flowering plant, from any one family: Solanaceae or Liliaceae (Poaceae, Asteraceae or Brassicaceae can be substituted in case of particular geographical location) including dissection and display of floral whorls, anther and ovary to show number of chambers (floral formulae and floral diagrams).
2. Study of osmosis by Potato osmometer.

**B: Study/Observation of the following (spotting):**

1. Parts of a compound microscope.
2. Specimens/slides/models and identification with reasons Bacteria, Oscillatoria, Spirogyra, Rhizopus, mushroom, yeast, liverwort, moss, fern, pine, one monocotyledonous plant, one dicotyledonous plant and one lichen.
3. Virtual specimens/slides/models and identifying features of - Amoeba, Hydra, liver fluke, Ascaris, leech, earthworm, prawn, silkworm, honeybee, snail, starfish, shark, rohu, frog, lizard, pigeon and rabbit.

**TERM -II**

**A: List of Experiments**

1. Separation of plant pigments through paper chromatography.
2. Study of distribution of stomata in the upper and lower surfaces of leaves.
3. Study of the rate of respiration in flower buds/leaf tissue and germinating seeds.
4. Test for presence of sugar in urine.
5. Test for presence of albumin in urine.

**B: Study/Observation of the following (spotting):**

1. Tissues and diversity in shape and size of animal cells (squamous epithelium, smooth, skeletal and cardiac muscle fibers and mammalian blood smear) through temporary/permanent slides.
2. Mitosis in onion root tip cells and animal cells (grasshopper) from permanent slides.

**BIOLOGY (Code No. 044)**

**Class XII**

**A: List of Experiments**

**TERM -I**

1. Isolate DNA from available plant material such as spinach, green pea seeds, papaya, etc.
2. Prepare a temporary mount to observe pollen germination.

**B: Study/Observation of the following (spotting):**

1. Flowers adapted to pollination by different agencies (wind, insects, birds).
2. Identification of stages of gamete development, i.e., T.S. of testis and T.S. of ovary through permanent slides (from grasshopper/mice).
3. Meiosis in onion bud cell or grasshopper testis through permanent slides.
4. T.S. of blastula through permanent slides (Mammalian).
5. Prepared pedigree charts of any one of the genetic traits such as rolling of tongue, blood groups, ear lobes, widow's peak and colour blindness.

**TERM -II**

**A: List of Experiments**

1. Prepare a temporary mount of onion root tip to study mitosis.
2. Collect water from two different water bodies around you and study them for pH, clarity and presence of any living organism
3. Collect and study soil from at least two different sites and study them for texture, moisture content, pH and water holding capacity. Correlate with the kinds of plants found in them.

**B: Study/Observation of the following (spotting):**

1. Common disease - causing organisms like Ascaris, Entamoeba, Plasmodium, any fungus causing ringworm through permanent slides, models or virtual images. Comment on symptoms of diseases that they cause.
2. Two plants and two animals (models/virtual images) found in xeric conditions. Comment upon their morphological adaptations.
3. Two plants and two animals (models/virtual images) found in aquatic conditions. Comment upon their morphological adaptations.