Telangana SSC (Class 10)

PHYSICAL SCIENCE

(Physics & Chemistry) – Chapter-wise Important Questions

Multiple Choice Questions (1 mark) | Short Answer Questions (2–4 marks) | Long Answer / Big Questions (4–8 marks)

This booklet covers all 12 chapters of the Telangana SCERT Class 10 Physical Science textbook (5 Physics chapters and 7 Chemistry chapters) and is meant for quick revision before SSC public examinations. MCQ answer keys are given at the end of each chapter's MCQ section.

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Chapter 1: Reflection of Light at Curved Surfaces

(Physics)

A. Multiple Choice Questions (MCQ)

1. The image formed by a plane mirror is

   (a) Real and inverted (b) Virtual and erect (c) Real and erect (d) Virtual and inverted

2. A concave mirror produces a real image equal in size to the object when the object is placed at

   (a) The focus (b) The centre of curvature (c) The pole (d) Infinity

3. The mirror formula is

   (a) 1/v + 1/u = 1/f (b) 1/v – 1/u = 1/f (c) 1/v + 1/u = 2/f (d) v + u = f

4. The power of a mirror of focal length 1 m is

   (a) 1 D (b) 2 D (c) 0.5 D (d) 100 D

5. A concave mirror forms a virtual image when the object is placed

   (a) Beyond the centre of curvature (b) At the focus (c) Between the pole and the focus (d) At the centre of curvature

6. The magnification produced by a plane mirror is

   (a) +1 (b) –1 (c) 0 (d) Infinite

Answer Key: 1-b, 2-b, 3-a, 4-a, 5-c, 6-a

B. Short Answer Questions

1. Define centre of curvature, radius of curvature and focal length of a spherical mirror.

2. An object 4 cm high is placed 30 cm in front of a concave mirror of focal length 15 cm. Find the position, size and nature of the image.

3. State the sign convention used for reflection by spherical mirrors.

4. Why are convex mirrors preferred as rear-view mirrors in vehicles?

C. Long Answer / Big Questions

1. Derive the mirror formula 1/v + 1/u = 1/f for a concave mirror forming a real image. (Use a ray diagram in your answer.)

2. With the help of ray diagrams, describe the nature, position and size of the image formed by a concave mirror when the object is placed (i) at infinity (ii) beyond C (iii) at focus F (iv) between P and F.

3. An object is placed at a distance of 10 cm from a convex mirror of focal length 15 cm. Find the position and nature of the image, and calculate the magnification.

Chapter 2: Chemical Reactions and Equations

(Chemistry)

A. Multiple Choice Questions (MCQ)

1. A balanced chemical equation is in accordance with the

   (a) Law of multiple proportions (b) Law of conservation of mass (c) Law of definite proportions (d) Avogadro's law

2. Rusting of iron is an example of a/an

   (a) Physical change (b) Oxidation reaction (c) Reduction reaction (d) Double displacement reaction

3. When calcium carbonate is heated strongly, it decomposes to give

   (a) CaO + CO2 (b) Ca + O2 (c) CaCO3 itself, unchanged (d) Ca(OH)2

4. Which of the following is a displacement reaction?

   (a) Fe + CuSO4 → FeSO4 + Cu (b) NaOH + HCl → NaCl + H2O (c) 2H2 + O2 → 2H2O (d) CaCO3 → CaO + CO2

5. A reaction in which two compounds exchange ions to form two new compounds is called a

   (a) Combination reaction (b) Decomposition reaction (c) Double displacement reaction (d) Displacement reaction

Answer Key: 1-b, 2-b, 3-a, 4-a, 5-c

B. Short Answer Questions

1. Balance the equation: Fe + H2O → Fe3O4 + H2.

2. What is a redox reaction? Give one example.

3. Why should a magnesium ribbon be cleaned before burning it in air?

4. Write the chemical equation for the reaction between zinc granules and dilute sulphuric acid.

C. Long Answer / Big Questions

1. Classify the following as combination, decomposition, displacement or double displacement reactions, giving a reason for each: (i) 2Mg + O2 → 2MgO (ii) CaCO3 → CaO + CO2 (iii) Zn + CuSO4 → ZnSO4 + Cu (iv) BaCl2 + Na2SO4 → BaSO4 + 2NaCl.

2. What is corrosion? Explain rancidity and suggest methods to prevent it.

3. Explain oxidation and reduction in terms of gain or loss of oxygen and hydrogen, giving two examples of each. Define a redox reaction using a suitable example.

Chapter 3: Acids, Bases and Salts

(Chemistry)

A. Multiple Choice Questions (MCQ)

1. The pH of a neutral solution is

   (a) 0 (b) 7 (c) 14 (d) Greater than 7

2. Which indicator turns pink in a basic solution?

   (a) Litmus (b) Methyl orange (c) Phenolphthalein (d) Turmeric

3. Common salt is chemically known as

   (a) Sodium carbonate (b) Sodium chloride (c) Sodium bicarbonate (d) Sodium hydroxide

4. Baking soda is

   (a) Na_2CO_3 (b) $NaHCO_3$ (c) NaOH (d) $CaCO_3$

5. Antacids used to relieve acidity contain

   (a) An acid (b) A base (c) A salt (d) An indicator

Answer Key: 1-b, 2-c, 3-b, 4-b, 5-b

B. Short Answer Questions

1. Why do acids conduct electricity in their aqueous solutions?

2. What happens when zinc metal reacts with dilute sodium hydroxide solution? Write the equation.

3. Write the method of preparation and one use of bleaching powder.

4. Why is it advised to add acid to water and not water to acid while diluting a concentrated acid?

C. Long Answer / Big Questions

1. Describe an activity to show that acids produce ions only in aqueous solution.

2. Explain the preparation, properties and uses of washing soda (sodium carbonate).

3. What is the pH scale? Explain its importance in daily life and in the human body, giving suitable examples.

Chapter 4: Refraction of Light at Curved Surfaces

(Physics)

A. Multiple Choice Questions (MCQ)

1. The lens formula is

   (a) 1/v – 1/u = 1/f (b) 1/v + 1/u = 1/f (c) 1/f = v + u (d) v – u = 1/f

2. The power of a convex lens is always

   (a) Positive (b) Negative (c) Zero (d) Infinite

3. A convex lens forms a virtual, erect and magnified image when the object is placed

   (a) Beyond 2F1 (b) At 2F1 (c) Between F1 and the optical centre (d) At F1

4. The SI unit of power of a lens is

   (a) Metre (b) Dioptre (c) Candela (d) Watt

5. The focal length of a lens of power +2 D is

   (a) 0.5 m (b) 2 m (c) 5 m (d) 20 m

Answer Key: 1-a, 2-a, 3-c, 4-b, 5-a

B. Short Answer Questions

1. Define the power of a lens and state its SI unit.

2. An object is placed 20 cm from a convex lens of focal length 10 cm. Find the image position using the lens formula.

3. Distinguish between a convex lens and a concave lens.

4. What is meant by the refractive index of a medium?

C. Long Answer / Big Questions

1. Derive the relationship between object distance, image distance and focal length (lens formula) for a convex lens, using a ray diagram.

2. Draw ray diagrams to show the image formed by a convex lens when the object is placed at (i) beyond 2F1 (ii) between F1 and 2F1 (iii) at F1 (iv) between the optical centre and F1.

3. A concave lens has a focal length of 15 cm. At what distance from the lens should an object 5 cm tall be placed so that it forms an image at 10 cm from the lens? Also find the size of the image.

Chapter 5: Human Eye and Colourful World

(Physics)

A. Multiple Choice Questions (MCQ)

1. The ability of the eye lens to adjust its focal length to focus on objects at different distances is called

   (a) Persistence of vision (b) Power of accommodation (c) Binocular vision (d) Dispersion

2. Myopia (short-sightedness) is corrected by using a

   (a) Convex lens (b) Concave lens (c) Cylindrical lens (d) Bifocal lens with only a convex part

3. The splitting of white light into its constituent colours is called

   (a) Reflection (b) Refraction (c) Dispersion (d) Scattering

4. The scattering of sunlight by tiny particles in the atmosphere makes the sky appear

   (a) Red (b) Blue (c) White (d) Black

5. The image formed on the retina of the human eye is

   (a) Virtual and erect (b) Real and inverted (c) Real and erect (d) Virtual and inverted

Answer Key: 1-b, 2-b, 3-c, 4-b, 5-b

B. Short Answer Questions

1. What are the near point and far point of a normal human eye?

2. What is presbyopia? How is it corrected?

3. Why does the sun appear reddish in colour early in the morning and at sunset?

4. Why is the colour of the clear sky blue?

C. Long Answer / Big Questions

1. What is myopia? Explain its causes and describe how it is corrected using lenses, with the help of ray diagrams.

2. What is hypermetropia? Explain its causes and correction with the help of a ray diagram.

3. Explain the dispersion of white light through a glass prism, and describe how a rainbow is formed in the sky.

Chapter 6: Structure of the Atom

(Chemistry)

A. Multiple Choice Questions (MCQ)

1. The number of protons present in an atom is called its

   (a) Mass number (b) Atomic number (c) Valency (d) Atomic mass

2. Electrons revolve around the nucleus of an atom in

   (a) Fixed circular paths called orbits (b) Completely random paths (c) Straight lines (d) No fixed path

3. The maximum number of electrons that can be accommodated in the M shell is

   (a) 2 (b) 8 (c) 18 (d) 32

4. Isotopes of an element have the same

   (a) Number of neutrons (b) Mass number (c) Atomic number (d) Number of nucleons

5. Who proposed the nuclear model of the atom?

   (a) J. J. Thomson (b) Ernest Rutherford (c) Niels Bohr (d) John Dalton

Answer Key: 1-b, 2-a, 3-c, 4-c, 5-b

B. Short Answer Questions

1. Write the postulates of Bohr's model of the atom.

2. Draw the electron arrangement of a sodium atom (atomic number 11).

3. What are isotopes? Give one example along with a use.

4. Distinguish between atomic number and mass number.

C. Long Answer / Big Questions

1. Describe Rutherford's alpha-particle scattering experiment and explain the observations that led to the discovery of the nucleus.

2. Explain the drawbacks of Rutherford's atomic model and how Bohr's model overcame them.

3. Explain the distribution of electrons in various shells (Bohr–Bury scheme), giving examples for elements up to atomic number 20.

Chapter 7: Classification of Elements – The Periodic Table

(Chemistry)

A. Multiple Choice Questions (MCQ)

1. The Modern Periodic Law states that the properties of elements are a periodic function of their

   (a) Atomic mass (b) Atomic number (c) Valency (d) Atomic size

2. Mendeleev arranged the elements in his periodic table in order of increasing

   (a) Atomic number (b) Atomic mass (c) Valency (d) Density

3. The number of elements in period 2 of the modern periodic table is

   (a) 2 (b) 8 (c) 18 (d) 32

4. On moving from left to right across a period, atomic size generally

   (a) Increases (b) Decreases (c) Remains the same (d) First increases then decreases

5. Elements placed in the same group of the periodic table have the same

   (a) Atomic size (b) Number of valence electrons (c) Atomic mass (d) Number of shells

Answer Key: 1-b, 2-b, 3-b, 4-b, 5-b

B. Short Answer Questions

1. State Mendeleev's periodic law and mention two limitations of his periodic table.

2. State the Modern Periodic Law.

3. How does atomic size vary along a period and down a group? Give reasons.

4. Why are the noble gases placed in a separate group of the periodic table?

C. Long Answer / Big Questions

1. Explain the achievements and limitations of Mendeleev's periodic table.

2. Discuss the periodic trends in (i) valency (ii) atomic size (iii) metallic character, across a period and down a group of the modern periodic table.

3. Explain Dobereiner's triads and Newlands' law of octaves with examples, and state their limitations.

Chapter 8: Chemical Bonding

(Chemistry)

A. Multiple Choice Questions (MCQ)

1. The chemical bond formed by the complete transfer of electrons from one atom to another is called a/an

(a) Covalent bond (b) Ionic bond (c) Coordinate bond (d) Metallic bond

2. The number of electrons shared between two atoms in a double covalent bond is

(a) 1 (b) 2 (c) 4 (d) 6

3. Sodium chloride (NaCl) is an example of a/an

(a) Covalent compound (b) Ionic compound (c) Metallic compound (d) Coordinate compound

4. The shape of a methane (CH_4) molecule is

(a) Linear (b) Trigonal planar (c) Tetrahedral (d) Pyramidal

5. Which theory explains the shapes of molecules on the basis of repulsion between electron pairs?

(a) VSEPR theory (b) Valence bond theory (c) Octet rule (d) Lewis theory

Answer Key: 1-b, 2-c, 3-b, 4-c, 5-a

B. Short Answer Questions

1. Draw the Lewis dot structure of a water molecule (H_2O).

2. Explain the formation of an ionic bond in sodium chloride (NaCl).

3. What is a covalent bond? Give one example each of a single, a double and a triple covalent bond.

4. What is hybridisation? Name the type of hybridisation present in the CH_4 molecule.

C. Long Answer / Big Questions

1. Explain the formation of ionic bonds in magnesium chloride ($MgCl_2$) using electron dot diagrams.

2. Explain the valence bond theory of covalent bond formation, taking the hydrogen (H_2) and chlorine (Cl_2) molecules as examples.

3. Explain the shapes of the BF_3, CH_4 and NH_3 molecules on the basis of hybridisation.

Chapter 9: Electric Current

(Physics)

A. Multiple Choice Questions (MCQ)

1. The SI unit of electric current is the

   (a) Volt (b) Ampere (c) Ohm (d) Coulomb

2. Ohm's law gives the relationship between

   (a) Potential difference and current (b) Current and resistance only (c) Power and current (d) Potential difference and power

3. The resistance of a conductor depends on its

   (a) Length only (b) Area of cross-section only (c) Length, area of cross-section and material (d) Current only

4. The SI unit of electrical power is the

   (a) Joule (b) Watt (c) Ampere (d) Ohm

5. When resistors are connected in series, the equivalent resistance is

   (a) Less than the smallest individual resistance (b) Equal to the smallest resistance (c) Greater than the largest individual resistance (d) Zero

Answer Key: 1-b, 2-a, 3-c, 4-b, 5-c

B. Short Answer Questions

1. State Ohm's law and write its mathematical expression, defining each term used.

2. Define resistivity and state its SI unit.

3. Two resistors of 4 Ω and 6 Ω are connected in parallel. Find the equivalent resistance.

4. Why is the filament of an electric bulb made of tungsten?

C. Long Answer / Big Questions

1. Derive the expression for the equivalent resistance when three resistors are connected in series, with the help of a circuit diagram.

2. Derive the expression for the equivalent resistance when three resistors are connected in parallel, with the help of a circuit diagram.

3. State the factors on which the resistance of a conductor depends, and derive the expression $R = \rho l/A$.

Chapter 10: Electromagnetism

(Physics)

A. Multiple Choice Questions (MCQ)

1. Oersted's experiment showed that an electric current

   (a) Produces heat (b) Has a magnetic effect (c) Can be stored (d) Attracts iron directly, like a permanent magnet

2. The rule used to find the direction of the force on a current-carrying conductor placed in a magnetic field is

   (a) The right-hand thumb rule (b) Fleming's left-hand rule (c) Fleming's right-hand rule (d) Lenz's law

3. An electric generator converts

   (a) Electrical energy into mechanical energy (b) Mechanical energy into electrical energy (c) Chemical energy into electrical energy (d) Heat energy into electrical energy

4. The phenomenon of producing an induced emf due to a change in magnetic flux is called

   (a) Electromagnetic induction (b) Electrostatic induction (c) Magnetic induction (d) Self-induction

5. The direction of an induced current is given by

   (a) Fleming's left-hand rule (b) The right-hand thumb rule (c) Lenz's law (d) Ampere's rule

Answer Key: 1-b, 2-b, 3-b, 4-a, 5-c

B. Short Answer Questions

1. State the right-hand thumb rule.

2. State Faraday's law of electromagnetic induction.

3. What is a solenoid? Describe the nature of the magnetic field produced by it.

4. Distinguish between alternating current (AC) and direct current (DC).

C. Long Answer / Big Questions

1. Describe the construction and working of an electric motor with the help of a labelled diagram.

2. Explain Faraday's law of electromagnetic induction and derive the expression for the induced emf.

3. Describe the construction and working of an AC generator with the help of a labelled diagram.

Chapter 11: Principles of Metallurgy

(Chemistry)

A. Multiple Choice Questions (MCQ)

1. Naturally occurring substances from which metals can be extracted profitably are called

   (a) Minerals (b) Ores (c) Gangue (d) Alloys

2. The unwanted impurities present in an ore are called

   (a) Flux (b) Slag (c) Gangue (d) Alloy

3. Metals placed above hydrogen in the activity series

   (a) Do not react with dilute acids (b) Displace hydrogen from dilute acids (c) Are always found in the free state (d) Are completely non-reactive

4. The reduction of a metal oxide to the metal using carbon (in a furnace) is called

   (a) Roasting (b) Calcination (c) Smelting (d) Refining

5. Alloys are generally

   (a) Pure metals (b) Homogeneous mixtures of a metal with another metal or non-metal (c) Chemical compounds of fixed composition (d) Ores

Answer Key: 1-b, 2-c, 3-b, 4-c, 5-b

B. Short Answer Questions

1. Distinguish between roasting and calcination.

2. Why are sodium, potassium and calcium never found in the free state in nature?

3. What is an alloy? Give the composition and one use of brass.

4. List, in order, the main steps involved in the extraction of a metal from its ore.

C. Long Answer / Big Questions

1. Explain the activity series of metals and discuss its significance in the extraction of metals.

2. Describe the process of extraction of a metal from its oxide ore by thermal reduction, giving relevant chemical equations.

3. Explain the electrolytic refining of metals with the help of a labelled diagram, taking the refining of copper as an example.

Chapter 12: Carbon and its Compounds

(Chemistry)

A. Multiple Choice Questions (MCQ)

1. The property of carbon atoms to form long chains by bonding with other carbon atoms is called

   (a) Isomerism (b) Catenation (c) Hybridisation (d) Allotropy

2. The functional group –OH represents a/an

   (a) Aldehyde (b) Alcohol (c) Ketone (d) Carboxylic acid

3. Diamond and graphite are

   (a) Isomers of each other (b) Isotopes of carbon (c) Allotropes of carbon (d) Isobars of carbon

4. The general formula of alkanes is

   (a) C_nH_{2n} (b) C_nH_{2n+2} (c) C_nH_{2n-2} (d) C_nH_{2n+1}

5. Vinegar is a dilute (5–8%) solution of

   (a) Formic acid (b) Acetic acid (c) Citric acid (d) Oxalic acid

Answer Key: 1-b, 2-b, 3-c, 4-b, 5-b

B. Short Answer Questions

1. Define catenation. Why does carbon show catenation to the maximum extent among all elements?

2. What are functional groups? Name the functional groups present in alcohols and carboxylic acids.

3. Distinguish between saturated and unsaturated hydrocarbons, giving one example of each.

4. Write the chemical equation for the reaction of ethanol with sodium metal.

C. Long Answer / Big Questions

1. Explain the homologous series with reference to alkanes. Give the general formula and the molecular formulas of its first four members.

2. Describe the process of saponification (soap formation) and explain the cleansing action of soap.

3. Write the chemical equations for the reaction of ethanoic acid (acetic acid) with (i) sodium hydroxide (ii) sodium carbonate (iii) ethanol (esterification).