

Bihar Board Class 10 Science Set I Question Paper with Solutions

Time Allowed :2 Hour 45 Minutes	Maximum Marks :80	Total Questions :80+30=110
---------------------------------	-------------------	----------------------------

SECTION A

Objective Type Questions

Question Nos. 1 to 80 are of objective type. Answer any 40 questions. Each question has four options out of which only one is correct. You have to mark your selected option on the OMR sheet.

1. The expulsion of water through stomata in the form of vapor from the aerial part of the plant is known as:

- (A) osmosis
- (B) transpiration
- (C) excretion
- (D) diffusion

Correct Answer: (B) transpiration

Solution: The process by which water is expelled from plants through the stomata (small pores in leaves and stems) in the form of vapor is called *transpiration*. This process plays a crucial role in maintaining the flow of water and nutrients from the roots to the rest of the plant, and also helps in cooling the plant.

Osmosis (option A) refers to the movement of water across a semipermeable membrane from a region of low solute concentration to high solute concentration. Excretion (option C) is the process of eliminating waste materials from the body. Diffusion (option D) refers to the movement of molecules from an area of higher concentration to an area of lower concentration, but not specifically in the context of water vapor expulsion in plants.

💡 Quick Tip

Transpiration helps in cooling plants, maintaining water flow, and ensuring the uptake of minerals from the soil.

2. The tiger is a consumer of:

- (A) first trophic level
- (B) second trophic level
- (C) third trophic level
- (D) none of these

Correct Answer: (C) third trophic level

Solution: The tiger, being a carnivore, feeds on herbivores (the second trophic level). It does not consume primary producers (plants), which are at the first trophic level, nor does it consume other carnivores, which are typically at higher levels. Therefore, the tiger occupies the third trophic level as a secondary consumer.

Quick Tip
In a food chain, primary consumers (herbivores) occupy the second trophic level, and secondary consumers (carnivores like the tiger) occupy the third trophic level.

3. The place of origin of humans is:

- (A) India
- (B) China
- (C) Africa
- (D) America

Correct Answer: (C) Africa

Solution: Based on fossil and genetic evidence, it is widely accepted that the origin of modern humans can be traced to Africa. The "Out of Africa" hypothesis suggests that humans evolved in Africa and later migrated to other regions of the world.

💡 Quick Tip

The origin of humans is traced back to Africa according to the "Out of Africa" theory.

4. Peristalsis movement is found in:

- (A) Colon
- (B) Oesophagus
- (C) Pancreas
- (D) Small intestine

Correct Answer: (B) Oesophagus

Solution: Peristalsis refers to the wave-like muscular contractions that move food through the digestive tract. This process is most notably found in the oesophagus, where it moves food from the mouth to the stomach. Peristalsis also occurs in other parts of the digestive system, such as the small intestine and colon.

💡 Quick Tip

Peristalsis is critical for the movement of food and liquids through the digestive system, starting from the oesophagus.

5. Open circulatory system is found in:

- (A) Pigeon
- (B) Butterfly
- (C) Man
- (D) Cat

Correct Answer: (B) Butterfly

Solution: An open circulatory system, where blood is not confined to vessels but flows freely within cavities, is found in arthropods such as butterflies. In contrast, vertebrates like humans, pigeons, and cats have a closed circulatory

system.

 Quick Tip

Arthropods like butterflies have an open circulatory system, which is different from the closed system found in vertebrates.

6. The carrier of oxygen in blood is:

- (A) fat
- (B) hormone
- (C) hemoglobin
- (D) carbohydrate

Correct Answer: (C) hemoglobin

Solution: The protein *hemoglobin* in red blood cells binds with oxygen in the lungs and carries it through the blood to tissues and organs. It is the primary carrier of oxygen in the blood.

 Quick Tip

Hemoglobin is responsible for the red color of blood and is essential for oxygen transport.

7. The number of pairs of autosomes in humans is:

- (A) 24
- (B) 23
- (C) 11
- (D) 22

Correct Answer: (D) 22

Solution: Humans have 23 pairs of chromosomes, out of which 22 pairs are autosomes, and the remaining pair are sex chromosomes (XX or XY).

💡 Quick Tip

In humans, 22 pairs of chromosomes are autosomes, and the 23rd pair are sex chromosomes.

8. The most effective color of visible light spectrum for photosynthesis is:

- (A) red
- (B) blue
- (C) yellow
- (D) green

Correct Answer: (A) red

Solution: Red light is the most effective in driving photosynthesis, although blue light also plays an important role. Plants reflect green light, which is why they appear green to us.

💡 Quick Tip

Red and blue light are primarily used by plants for photosynthesis, while green light is reflected.

9. Which one of the following is the natural source of oxalic acid?

- (A) Tomato
- (B) Tamarind
- (C) Orange
- (D) Vinegar

Correct Answer: (B) Tamarind

Solution: Tamarind is known to contain oxalic acid, a naturally occurring compound. It is one of the notable sources of this acid in nature, along with other plants such as spinach and rhubarb.

💡 Quick Tip

Tamarind contains a significant amount of oxalic acid, which contributes to its tart flavor.

10. Propane, with the molecular formula C_3H_8 , has:

- (A) 7 covalent bonds
- (B) 8 covalent bonds
- (C) 9 covalent bonds
- (D) 10 covalent bonds

Correct Answer: (D) 10 covalent bonds

Solution: Step 1: Understanding the structure of propane C_3H_8 .

Propane consists of three carbon (C) atoms and eight hydrogen (H) atoms. The structure of propane is as follows:



Step 2: Identifying the covalent bonds.

1. Each carbon forms a single bond with other carbon atoms. 2. Each carbon also forms single bonds with hydrogen atoms. 3. Carbon always forms four covalent bonds (either with carbon or hydrogen).

Step 3: Counting the bonds.

- There are 2 carbon-carbon ($C - C$) single bonds. - There are 8 carbon-hydrogen ($C - H$) single bonds.

$$\text{Total covalent bonds} = 2(C - C) + 8(C - H) = 10.$$

Thus, the total number of covalent bonds in propane is 10.

💡 Quick Tip

To determine the number of covalent bonds in an organic molecule, count all single, double, or triple bonds formed between atoms.

11. The ozone layer protects the Earth from which harmful radiation?

- (A) Infrared
- (B) Thermal
- (C) Ultraviolet
- (D) All of these

Correct Answer: (C) Ultraviolet

Solution: The ozone layer primarily absorbs and blocks ultraviolet (UV) radiation from the Sun. UV radiation can cause significant harm to living organisms, which is why the ozone layer is vital for life on Earth.

💡 Quick Tip

The ozone layer shields us from harmful UV radiation, which is why it is critical for human health and the environment.

12. Which non-metal is found in liquid state at room temperature?

- (A) Mercury
- (B) Bromine
- (C) Sulphur
- (D) Sodium

Correct Answer: (B) Bromine

Solution: Bromine is the only non-metal that exists as a liquid at room temperature. It is a halogen and is reddish-brown in color.

💡 Quick Tip

Bromine is a non-metal that is unique in being a liquid at room temperature.

13. Which one of the following is a metalloid?

- (A) Fe
- (B) Cu
- (C) Ni

(D) As

Correct Answer: (D) As

Solution: Arsenic (As) is a metalloid, meaning it has characteristics of both metals and non-metals. Fe, Cu, and Ni are metals.

 Quick Tip

Metalloids, like arsenic, have properties that are intermediate between metals and non-metals.

14. $\text{CaCO}_3(s) \rightarrow \text{CaO}(s) + \text{CO}_2(g)$ is what type of reaction?

- (A) Decomposition
- (B) Combination
- (C) Displacement
- (D) Double displacement

Correct Answer: (A) Decomposition

Solution: This is a *decomposition reaction* where one reactant (CaCO_3) breaks down into two products (CaO and CO_2).

 Quick Tip

Decomposition reactions involve the breakdown of a single compound into two or more products.

15. Which of the following equations is balanced?

- (A) $\text{Mg} + \text{O}_2 \rightarrow \text{MgO}$
- (B) $\text{Zn} + \text{H}_2\text{SO}_4 \rightarrow \text{ZnSO}_4 + \text{H}_2$
- (C) $\text{Fe} + \text{Cl}_2 \rightarrow \text{FeCl}_3$
- (D) $\text{H}_2 + \text{Cl}_2 \rightarrow \text{HCl}$

Correct Answer: (D) $\text{H}_2 + \text{Cl}_2 \rightarrow \text{HCl}$

Solution: The equation $\text{H}_2 + \text{Cl}_2 \rightarrow \text{HCl}$ is balanced as both sides contain the same number of hydrogen and chlorine atoms.

💡 Quick Tip

Always check if the number of atoms of each element is the same on both sides of the equation for it to be balanced.

16. Which of the following causes acid rain in industrial areas?

- (A) Chlorofluorocarbon
- (B) Sulphur dioxide
- (C) Ozone
- (D) Carbon dioxide

Correct Answer: (B) Sulphur dioxide

Solution: Sulphur dioxide (SO_2) is primarily responsible for acid rain. It reacts with water vapor in the atmosphere to form sulfuric acid, which contributes to acid rain.

💡 Quick Tip

Sulphur dioxide is a significant pollutant produced by industrial activities that causes acid rain.

17. 10 cm is positive, if the value of object distance is:

- (A) more than 10 cm
- (B) more than 20 cm
- (C) less than 10 cm
- (D) none of these

Correct Answer: (C) less than 10 cm

Solution: Step 1: Understanding magnification in a concave mirror.

The magnification (m) of a concave mirror is given by:

$$m = \frac{-v}{u}$$

where: - v is the image distance, - u is the object distance.

For a concave mirror: - If the image is real and inverted, the magnification is negative. - If the image is virtual and upright, the magnification is positive.

Step 2: Condition for positive magnification.

- A concave mirror produces a positive magnification only when the image is virtual and erect. - This happens when the object is placed between the focus (F) and the pole (P) of the mirror. - The focal length of the mirror is given as 10 cm, meaning the focal point is at $u = -10$ cm.

Step 3: Finding the correct range for object distance u .

- If the object is placed at $u < 10$ cm (i.e., between the pole and focus), the image will be virtual, upright, and magnified. - Hence, the correct answer is (C) less than 10 cm.

💡 Quick Tip

A concave mirror produces a virtual and magnified image when the object is placed between the pole and the focus.

18. On moving from focus towards the pole, the magnification in a concave mirror:

- (A) increases
- (B) decreases
- (C) remains constant
- (D) none of these

Correct Answer: (A) increases

Solution: Step 1: Understanding magnification in a concave mirror.

The magnification (m) of a concave mirror is given by:

$$m = \frac{-v}{u}$$

where: - v is the image distance, - u is the object distance.

For a concave mirror: - When the object is beyond the center of curvature (C), the image is real, inverted, and smaller ($|m| < 1$). - When the object is at C ,

the image is of the same size ($|m| = 1$). - When the object is between C and F (focus), the image is real, inverted, and magnified ($|m| > 1$). - When the object is at F , the image is formed at infinity. - When the object is between F and P (pole), the image is virtual, upright, and highly magnified.

Step 2: Behavior of magnification as the object moves from F to P .

- When the object moves from the focus towards the pole, the image remains virtual and magnified. - The magnification increases as the object gets closer to the mirror. - At the pole, the magnification tends to infinity.

Step 3: Conclusion.

Since magnification increases as the object moves towards the pole, the correct answer is (A) increases.

💡 Quick Tip

In a concave mirror, moving an object from the focus towards the pole increases magnification, making the image larger and more upright.

19. Which energy does a hydro-electric power plant convert into electric energy?

- (A) Nuclear energy
- (B) Solar energy
- (C) Potential energy
- (D) Thermal energy

Correct Answer: (C) Potential energy

Solution: A hydro-electric power plant converts potential energy of water (stored at a height) into mechanical energy, which is then converted to electrical energy.

💡 Quick Tip

The potential energy of water in a hydroelectric plant is converted to electrical energy using turbines.

20. A rectangular coil of a copper wire is rotated in a magnetic field. The direction of the induced current in the coil changes after:

- (A) every one-fourth rotation
- (B) every half rotation
- (C) every one rotation
- (D) every two rotations

Correct Answer: (C) every one rotation

Solution: The direction of the induced current changes after one full rotation (360°), i.e., every one rotation.

💡 Quick Tip

The induced current in a rotating coil changes direction every full rotation.

21. The image of an ant in a concave mirror is erect and goes increasing as the ant moves along the principal axis. The direction of motion of the ant is:

- (A) from focus to centre of curvature
- (B) from focus to pole
- (C) from pole to focus
- (D) none of these

Correct Answer: (C) from pole to focus

Solution: In a concave mirror, when an object moves from the pole towards the focus, the image increases in size and remains erect.

💡 Quick Tip

The image formed by a concave mirror becomes larger as the object moves from the pole towards the focus.

22. The radius of curvature of the lens of an eye is controlled by:

- (A) retina

- (B) iris
- (C) pupil
- (D) ciliary muscles

Correct Answer: (D) ciliary muscles

Solution: The ciliary muscles are responsible for controlling the curvature of the lens in the eye, which enables the eye to focus on near and far objects.

💡 Quick Tip

Ciliary muscles adjust the lens shape to focus light on the retina.

23. Why is the colour of some clouds white?

- (A) Due to reflection
- (B) Due to scattering
- (C) Due to absorption
- (D) Due to refraction

Correct Answer: (B) Due to scattering

Solution: Clouds appear white because light is scattered in all directions by the water droplets in the clouds. This scattering of all colors of light leads to a white appearance.

💡 Quick Tip

Scattering of light by tiny droplets or particles results in the white color of clouds.

24. The SI unit of resistance is:

- (A) ampere
- (B) watt
- (C) ohm
- (D) volt

Correct Answer: (C) ohm

Solution: The SI unit of resistance is the ohm (Ω), which is defined as the resistance that allows one ampere of current to flow when one volt is applied.

 Quick Tip

The unit of resistance, the ohm, is the reciprocal of the unit of conductance, the siemens.

25. Kidney helps in:

- (A) respiration
- (B) reproduction
- (C) excretion
- (D) digestion

Correct Answer: (C) excretion

Solution: The kidney plays a vital role in excretion by filtering waste materials and regulating water balance in the body.

 Quick Tip

Kidneys are essential for removing waste products from the blood and maintaining fluid balance in the body.

26. Photosynthesis takes place during:

- (A) Morning-evening
- (B) Day only
- (C) Day-night
- (D) Night only

Correct Answer: (B) Day only

Solution: Photosynthesis occurs only in the presence of light, so it happens during the day when sunlight is available.

💡 Quick Tip

Photosynthesis is a process that requires sunlight, so it only takes place during the day.

27. Synaptic knobs are found in:

- (A) kidney
- (B) brain
- (C) ovary
- (D) neuron

Correct Answer: (D) neuron

Solution: Synaptic knobs, or axon terminals, are found at the ends of neurons and are responsible for transmitting nerve signals.

💡 Quick Tip

Synaptic knobs release neurotransmitters that enable communication between neurons.

28. Which of the following has the fastest heartbeat?

- (A) Elephant
- (B) Human
- (C) Rat
- (D) Whale

Correct Answer: (C) Rat

Solution: Rats have the fastest heartbeat among the listed animals, with a heart rate that can exceed 500 beats per minute.

💡 Quick Tip

Smaller animals generally have higher heart rates than larger animals.

29. Which of the following is a cellular fuel?

- (A) Protein
- (B) Glucose
- (C) Fat
- (D) None of these

Correct Answer: (B) Glucose

Solution: Glucose is the primary fuel for cellular respiration. It is broken down in cells to release energy.

💡 Quick Tip

Glucose is the main energy source for cells in the body, used to produce ATP.

30. How many phosphates are there in ATP?

- (A) 1
- (B) 2
- (C) 3
- (D) 4

Correct Answer: (C) 3

Solution: ATP contains three phosphate groups, which are essential for storing and transferring energy within cells.

💡 Quick Tip

ATP is the primary energy source in cells, and it has three phosphate groups.

31. Which of the following is not an excretory organ of humans?

- (A) Lungs
- (B) Kidney

- (C) Pancreas
- (D) Skin

Correct Answer: (C) Pancreas

Solution: The pancreas is not involved in excretion; it is an endocrine and digestive organ. The lungs, kidneys, and skin are involved in excretion.

💡 Quick Tip

The pancreas is important for digestion and regulating blood sugar, not excretion.

32. The smallest endocrine gland is:

- (A) Adrenal
- (B) Thyroid
- (C) Pineal
- (D) None of these

Correct Answer: (C) Pineal

Solution: The pineal gland is the smallest endocrine gland, located in the brain, and is responsible for producing melatonin.

💡 Quick Tip

The pineal gland, though small, plays a key role in regulating sleep patterns.

33. All acids dissolve in water to give:

- (A) H^+ ion
- (B) OH^- ion
- (C) Electron
- (D) Neutron

Correct Answer: (A) H^+ ion

Solution: Acids release H^+ ions (protons) when they dissolve in water, which is what makes the solution acidic.

💡 Quick Tip

The presence of H^+ ions is what defines a substance as acidic.

34. Which of the following compounds is a weak acid?

- (A) HCl
- (B) CH_3COOH
- (C) H_2SO_4
- (D) HNO_3

Correct Answer: (B) CH_3COOH

Solution: Acetic acid (CH_3COOH) is a weak acid because it partially dissociates in water, unlike HCl , H_2SO_4 , and HNO_3 , which are strong acids.

💡 Quick Tip

Weak acids like acetic acid dissociate only partially in water.

35. What is the color of silver iodide?

- (A) White
- (B) Blue
- (C) Yellow
- (D) Green

Correct Answer: (C) Yellow

Solution: Silver iodide (AgI) appears yellow in color due to its crystal properties.

 Quick Tip

Silver iodide is used in photographic films and has a distinctive yellow color.

36. The hardest natural substance is:

- (A) Silver
- (B) Gold
- (C) Diamond
- (D) Iron

Correct Answer: (C) Diamond

Solution: Diamond is the hardest known natural substance, with the highest rating on the Mohs scale of hardness.

 Quick Tip

Diamond has the highest hardness of any known natural substance.

37. How many crystalline allotropes of carbon are there?

- (A) 1
- (B) 2
- (C) 3
- (D) 4

Correct Answer: (C) 3

Solution: Carbon has three crystalline allotropes: diamond, graphite, and graphene.

 Quick Tip

Diamond, graphite, and graphene are the three crystalline forms of carbon.

38. Zinc blende is an ore of which metal?

- (A) Mg
- (B) Zn
- (C) Pb
- (D) Au

Correct Answer: (B) Zn

Solution: Zinc blende (ZnS) is an ore of zinc.

 Quick Tip

Zinc blende is the primary ore from which zinc is extracted.

39. How many bonds are there between two atoms in a molecule of nitrogen?

- (A) 1
- (B) 2
- (C) 3
- (D) 4

Correct Answer: (C) 3

Solution: In a nitrogen molecule (N_2), the two nitrogen atoms are bonded by a triple bond, which consists of three shared electron pairs.

 Quick Tip

Nitrogen gas (N_2) has a triple bond between the two nitrogen atoms.

40. The general formula of alkyne is:

- (A) C_nH_{2n+2}
- (B) C_nH_{2n}
- (C) C_nH_{2n-2}
- (D) C_nH_{2n-1}

Correct Answer: (C) C_nH_{2n-2}

Solution: The general formula for alkynes, which have a triple bond, is C_nH_{2n-2} .

💡 Quick Tip

Alkynes contain at least one triple bond and have the general formula C_nH_{2n-2} .

41. Kilowatt-hour (kWh) is the unit of:

- (A) energy
- (B) time
- (C) mass
- (D) power

Correct Answer: (A) energy

Solution: Kilowatt-hour (kWh) is a unit of energy, specifically used to quantify electrical energy consumption.

💡 Quick Tip

Kilowatt-hour is the standard unit for measuring electrical energy.

42. The amount of light entering the human eye is controlled by:

- (A) Ciliary muscles
- (B) Pupil
- (C) Cornea
- (D) Iris

Correct Answer: (D) iris

Solution: Step 1: Understanding the function of the iris in the human eye.

- The iris is the colored part of the eye that surrounds the pupil. - It contains muscles that contract or relax to adjust the size of the pupil. - The pupil

regulates the amount of light entering the eye.

Step 2: Why the iris controls light entry.

- In bright light, the iris constricts, making the pupil smaller to limit the amount of light entering. - In dim light, the iris expands, making the pupil larger to allow more light in. - This automatic adjustment helps protect the retina from excessive light and ensures clear vision.

Step 3: Analyzing the options.

- Ciliary muscles (Option A): Control the shape of the lens for focusing, not light entry. - Pupil (Option B): It is the opening through which light enters, but the iris controls its size. - Cornea (Option C): It helps focus light onto the retina but does not control the amount of light entering. - Iris (Option D): It adjusts the pupil size to control light entry.

Conclusion: Since the iris controls the amount of light entering the eye, the correct answer is (D) iris.

💡 Quick Tip

The iris controls the size of the pupil, which regulates the amount of light entering the eye, ensuring proper vision.

43. Which is the conventional source of energy?

- (A) Nuclear energy source
- (B) Geo-thermal energy source
- (C) Biomass
- (D) None of these

Correct Answer: (C) Biomass

Solution: Biomass, which includes wood, agricultural residues, and animal waste, is considered a conventional energy source used for heating and cooking.

💡 Quick Tip

Biomass has been used historically for energy production and is considered a conventional energy source.

44. The maximum number of electrons in a shell is:

- (A) $4n^2$
- (B) $3n^2$
- (C) $2n^2$
- (D) n^2

Correct Answer: (C) $2n^2$

Solution: The maximum number of electrons that can be held in a shell is $2n^2$, where n is the shell number.

 Quick Tip

The formula for the maximum number of electrons in a shell is $2n^2$.

45. Which hydrocarbon is the simplest compound?

- (A) Methane
- (B) Propane
- (C) Butane
- (D) Ethane

Correct Answer: (A) Methane

Solution: Methane (CH_4) is the simplest hydrocarbon because it contains only one carbon atom bonded to four hydrogen atoms.

 Quick Tip

Methane is the simplest alkane and the main component of natural gas.

46. Which of the following metals has the lowest melting point?

- (A) Na
- (B) Cu
- (C) Fe
- (D) Al

Correct Answer: (A) Na

Solution: Sodium (Na) has the lowest melting point among these metals, at approximately 98°C.

💡 Quick Tip

Sodium has the lowest melting point among alkali metals.

47. The atomic number of gold is:

- (A) 23
- (B) 43
- (C) 79
- (D) 80

Correct Answer: (C) 79

Solution: Gold (Au) has an atomic number of 79.

💡 Quick Tip

Gold is an element with the atomic number 79 and is represented by the symbol Au.

48. Which of the following is a salt?

- (A) HCl
- (B) NH_4OH
- (C) NaOH
- (D) K_2SO_4

Correct Answer: (D) K_2SO_4

Solution: K_2SO_4 is a salt formed by the reaction between a strong acid (H_2SO_4) and a strong base (KOH).

💡 Quick Tip

Salts are formed from the neutralization of acids and bases.

49. Depletion of the ozone layer is due to:

- (A) ATP
- (B) CFC
- (C) NADP
- (D) DDT

Correct Answer: (B) CFC

Solution: CFCs (Chlorofluorocarbons) are compounds that release chlorine atoms when they break down in the stratosphere, causing the depletion of the ozone layer.

💡 Quick Tip

CFCs are harmful to the ozone layer and have been banned in many countries due to their environmental impact.

50. In which of the following organisms does asexual reproduction occur through budding?

- (A) Plasmodium
- (B) Leishmania
- (C) Amoeba
- (D) Yeast

Correct Answer: (D) Yeast

Solution: Yeast undergoes asexual reproduction through budding, where a small bud forms on the parent organism and eventually detaches to form a new individual.

💡 Quick Tip

Budding is a form of asexual reproduction observed in organisms like yeast and hydra.

51. An example of plant hormone is:

- (A) IAA
- (B) TSH
- (C) ACH
- (D) ACTH

Correct Answer: (A) IAA

Solution: IAA (Indole-3-acetic acid) is a naturally occurring plant hormone responsible for regulating growth.

💡 Quick Tip

IAA is a type of auxin that helps in cell growth and elongation in plants.

52. Vegetative propagation in potato takes place by:

- (A) Root
- (B) Seed
- (C) Fruit
- (D) Stem

Correct Answer: (D) Stem

Solution: Potatoes propagate vegetatively through their tubers, which are modified stems that can give rise to new plants.

💡 Quick Tip

Tubers are specialized stem structures that allow potatoes to reproduce vegetatively.

53. Hydrilla is found:

- (A) In water
- (B) In soil
- (C) On tree
- (D) All of these

Correct Answer: (A) In water

Solution: Hydrilla is an aquatic plant commonly found in freshwater environments.

 Quick Tip

Hydrilla is a submerged aquatic plant that thrives in shallow freshwater habitats.

54. Systolic blood pressure of a healthy person is:

- (A) 140 mm Hg
- (B) 120 mm Hg
- (C) 100 mm Hg
- (D) 80 mm Hg

Correct Answer: (B) 120 mm Hg

Solution: Normal systolic blood pressure in a healthy adult is typically around 120 mm Hg, which is the upper value of the blood pressure reading.

 Quick Tip

Systolic blood pressure represents the pressure in the arteries when the heart contracts.

55. An example of a bisexual organism is:

- (A) Hydra

- (B) Man
- (C) Fish
- (D) Goat

Correct Answer: (A) Hydra

Solution: Hydra is a bisexual organism capable of producing both male and female gametes, allowing for self-fertilization.

💡 Quick Tip

Bisexual organisms can produce both male and female reproductive cells.

56. In fish, respiration takes place through:

- (A) Mouth
- (B) Gills
- (C) Nose
- (D) Lungs

Correct Answer: (B) Gills

Solution: Fish use gills to extract oxygen from water. Water flows over the gills, and oxygen is absorbed while carbon dioxide is expelled.

💡 Quick Tip

Fish use gills for gas exchange in water, unlike land animals that use lungs.

57. The valency of all elements in a group of the periodic table is:

- (A) Same
- (B) Different
- (C) Both (A) and (B)
- (D) None of these

Correct Answer: (A) Same

Solution: Elements in the same group of the periodic table have the same number of valence electrons and, therefore, the same valency.

 Quick Tip

Elements in the same group have the same valency due to similar electron configurations.

58. Which of the following is used as wine?

- (A) Ethanol
- (B) Methanol
- (C) Vinegar
- (D) Methanoic acid

Correct Answer: (A) Ethanol

Solution: Wine contains ethanol, which is a type of alcohol produced during fermentation.

 Quick Tip

Ethanol is the type of alcohol present in alcoholic beverages like wine.

59. What is the number of elements in the third group of the periodic table?

- (A) 18
- (B) 12
- (C) 10
- (D) 8

Correct Answer: (D) 8

Solution: Step 1: Understanding Group 3 of the Periodic Table.

- The third group of the periodic table includes elements from both the main

group and transition series. - It consists of Scandium (Sc), Yttrium (Y), Lanthanum (La), and Actinium (Ac) as well as elements from the lanthanide and actinide series.

Step 2: Counting the elements.

- Scandium (Sc) and Yttrium (Y) are always included. - The inclusion of Lanthanum (La) and Actinium (Ac) follows the periodic trends. - The lanthanides and actinides also belong to the third group, leading to a total count of 8 elements.

Step 3: Conclusion.

- Since the total number of elements in Group 3 is 8, the correct answer is (D) 8.

 Quick Tip

Group 3 of the periodic table contains 8 elements, including transition metals and some lanthanides and actinides.

60. Which is used in a solar cell?

- (A) Uranium
- (B) Plastic
- (C) Silicon
- (D) Plutonium

Correct Answer: (C) Silicon

Solution: Silicon is the primary material used in the production of solar cells due to its excellent semiconducting properties.

 Quick Tip

Silicon is the key component in most solar cells because of its semiconductor nature.

61. The electronic configuration of an element is 2, 8, 7. What is the atomic number of the element?

- (A) 10

- (B) 11
- (C) 17
- (D) 19

Correct Answer: (C) 17

Solution: The atomic number is the total number of electrons in an atom. With the configuration 2, 8, 7, the atomic number is 17.

 Quick Tip

The atomic number corresponds to the number of electrons or protons in an element.

62. Duralumin is an alloy of which metal?

- (A) Fe
- (B) Sn
- (C) Al
- (D) Cu

Correct Answer: (C) Al

Solution: Duralumin is an alloy primarily composed of aluminum (Al) and small amounts of copper and other elements.

 Quick Tip

Duralumin is a strong and light alloy made of aluminum and copper.

63. The molecular formula of sodium phosphate is:

- (A) NaPO_4
- (B) Na_3PO_4
- (C) $\text{Na}_2(\text{PO}_4)_3$
- (D) Na_2PO_4

Correct Answer: (B) Na_3PO_4

Solution: Sodium phosphate has the formula Na_3PO_4 , with three sodium ions balancing the charge of the phosphate ion.

💡 Quick Tip

Sodium phosphate is used in detergents and as a food additive.

64. The structural and functional unit of kidney is called:

- (A) Urinary bladder
- (B) Glomerulus
- (C) Bowman's capsule
- (D) Nephron

Correct Answer: (D) Nephron

Solution: The nephron is the functional unit of the kidney, involved in filtering the blood and producing urine.

💡 Quick Tip

Each kidney contains millions of nephrons that perform the essential tasks of filtration.

65. What should be the minimum speed of wind in a wind electric generator?

- (A) 1500 km/h
- (B) 150 km/h
- (C) 15 km/h
- (D) 1-5 km/h

Correct Answer: (C) 15 km/h

Solution: A wind speed of at least 15 km/h is required for a wind electric generator to begin generating electricity.

💡 Quick Tip

Wind turbines typically begin generating electricity at speeds above 15 km/h.

66. A split ring is used in:

- (A) Galvanometer
- (B) D.C. motor
- (C) Microscope
- (D) None of these

Correct Answer: (B) D.C. motor

Solution: A split ring is used in D.C. motors as a commutator to reverse the current direction and ensure continuous rotation.

💡 Quick Tip

Split rings are crucial components in D.C. motors for current reversal.

67. Metallic conduction is based on the motion of which particle in material?

- (A) Electron
- (B) Proton
- (C) Neutron
- (D) None of these

Correct Answer: (A) Electron

Solution: In metallic conduction, free electrons move through the lattice, transferring energy and enabling electrical conductivity.

💡 Quick Tip

Electrons are the charge carriers in metallic conduction.

68. The upper part of a box-type solar cooker has a glass cover. The reason for this is:

- (A) To see whether the food kept inside the cooker is being cooked or not
- (B) To prevent loss of heat due to radiation
- (C) To prevent the passage of dust into the box
- (D) None of these

Correct Answer: (B) To prevent loss of heat due to radiation

Solution: The glass cover of a box-type solar cooker helps to trap the heat inside and prevent it from escaping, thus reducing heat loss due to radiation. This is important for efficient cooking.

 Quick Tip

The glass cover allows sunlight to pass through and prevents heat loss, making the cooker more effective.

69. A resistor of power P_1 at voltage V_1 is connected in series with another resistor of power P_2 at voltage V_2 . The equivalent resistance will be:

- (A) $\frac{V_1^2}{P_1} + \frac{V_2^2}{P_2}$
- (B) $\frac{P_1^2}{V_1} + \frac{P_2^2}{V_2}$
- (C) $\frac{P_1 + P_2}{(V_1 + V_2)^2}$
- (D) $\frac{P_1}{V_1^2} + \frac{P_2}{V_2^2}$

Correct Answer: (A) $\frac{V_1^2}{P_1} + \frac{V_2^2}{P_2}$

Solution: When two resistors are connected in series, the equivalent resistance R_{eq} is the sum of individual resistances. Using the formula $R = \frac{V^2}{P}$ for each resistor, the equivalent resistance becomes:

$$R_{\text{eq}} = \frac{V_1^2}{P_1} + \frac{V_2^2}{P_2}$$

💡 Quick Tip

For resistors in series, the total resistance is the sum of individual resistances.

70. The frequency of alternating current in household electric circuits is:

- (A) 50 Hz
- (B) 60 Hz
- (C) 100 Hz
- (D) 220 Hz

Correct Answer: (A) 50 Hz

Solution: In most countries, the alternating current (AC) supplied to households has a frequency of 50 Hz.

💡 Quick Tip

The standard frequency for AC supply in many countries is 50 Hz.

71. Which of the following has the lowest refractive index?

- (A) Turpentine
- (B) Benzene
- (C) Water
- (D) Kerosine

Correct Answer: (C) Water

Solution: Step 1: Understanding refractive index.

The refractive index (n) of a medium determines how much light bends when it enters the medium from air. A lower refractive index means light bends less.

Step 2: Comparing refractive indices.

The approximate refractive indices of the given substances are: - Water: $n \approx 1.33$ (Lowest) - Kerosene: $n \approx 1.44 - 1.48$ - Benzene: $n \approx 1.50$ - Turpentine: $n \approx 1.47$

Step 3: Conclusion.

- Water has the lowest refractive index among the given options. - Hence, the correct answer is (C) Water.

💡 Quick Tip

A lower refractive index means the medium is less optically dense, allowing light to travel faster through it.

72. A simple prism is bounded by how many surfaces?

- (A) 3
- (B) 4
- (C) 5
- (D) 6

Correct Answer: (C) 5

Solution: Step 1: Understanding the structure of a simple prism.

A prism is a transparent optical element with flat, polished surfaces that refract light. A triangular prism, which is the simplest type of prism, consists of:
1. Two triangular faces (base surfaces). 2. Three rectangular faces (lateral surfaces).

Step 2: Counting the total surfaces.

- The prism has two triangular faces (top and bottom). - It also has three rectangular lateral faces.

$$\text{Total surfaces} = 2 + 3 = 5$$

Step 3: Conclusion.

Since a simple prism is bounded by 5 surfaces, the correct answer is (C) 5.

💡 Quick Tip

A simple triangular prism is enclosed by two triangular bases and three rectangular lateral surfaces, making a total of 5 surfaces.

73. The far point for normal vision is:

- (A) 25 mm
- (B) 25 cm
- (C) 25 m
- (D) Infinity

Correct Answer: (D) infinity

Solution: Step 1: Understanding the far point of normal vision.

The far point of vision is the maximum distance at which an object can be seen clearly without accommodation.

For a person with normal vision, the farthest distance they can see clearly is infinity.

Step 2: Analyzing the options.

- 25 mm (Option A): This is extremely short and incorrect. - 25 cm (Option B): This is incorrect; this is closer to the near point of vision. - 25 m (Option C): This is incorrect, as normal vision extends far beyond this range. - Infinity (Option D): This is correct because a normal human eye can focus on objects at an infinite distance.

Step 3: Conclusion.

- The far point for normal vision is at infinity. - Hence, the correct answer is (D) infinity.

💡 Quick Tip

For a person with normal vision, the farthest point they can see clearly without accommodation is at infinity.

74. What will be the nature of the image of an object, if magnification of the image is negative?

- (A) Real and erect
- (B) Virtual and erect
- (C) Virtual and inverted
- (D) Real and inverted

Correct Answer: (D) Real and inverted

Solution: If the magnification is negative, the image formed is real and inverted. This occurs for real objects placed outside the focal point in concave

mirrors.

 Quick Tip

Negative magnification indicates an inverted and real image.

75. How many laws are there for reflection of light?

- (A) 1
- (B) 2
- (C) 3
- (D) 4

Correct Answer: (B) 2

Solution: There are two laws of reflection: 1) The angle of incidence equals the angle of reflection, and 2) The incident ray, reflected ray, and normal lie in the same plane.

 Quick Tip

The two laws of reflection are: 1) angle of incidence = angle of reflection, and 2) all rays lie in the same plane.

76. A ray of light is incident perpendicular to a plane mirror. The angle of reflection will be:

- (A) 135°
- (B) 90°
- (C) 45°
- (D) 0°

Correct Answer: (D) 0°

Solution: When the ray of light is perpendicular to the mirror, the angle of incidence is 0° , so the angle of reflection will also be 0° .

💡 Quick Tip

The angle of reflection is always equal to the angle of incidence.

77. Which color of light scatters more in the atmosphere?

- (A) Yellow
- (B) Orange
- (C) Red
- (D) Blue

Correct Answer: (D) Blue

Solution: Blue light scatters more than other colors due to its shorter wavelength, causing the sky to appear blue.

💡 Quick Tip

Shorter wavelengths like blue light scatter more, making the sky blue.

78. Converging lens in air is:

- (A) Concave lens of glass
- (B) Plano-concave lens of glass
- (C) Convex lens of glass
- (D) None of these

Correct Answer: (C) Convex lens of glass

Solution: A converging lens is a convex lens that focuses parallel light rays towards a single point.

💡 Quick Tip

Converging lenses are typically convex lenses.

79. If the lower half of a concave mirror gets broken, then the image:

- (A) Will form erect
- (B) Will be halved
- (C) Will be less intense
- (D) None of these

Correct Answer: (C) Will be less intense

Solution: If half of the concave mirror is missing, the intensity of the image decreases, but the nature of the image remains unchanged.

💡 Quick Tip

A broken concave mirror reduces the intensity of the formed image.

80. When a ray of light travels from air (a rarer medium) to glass (a denser medium), it bends:

- (A) Away from the normal
- (B) Towards the normal
- (C) Parallel to the normal
- (D) None of these

Correct Answer: (B) Towards the normal

Solution: When light moves from a rarer medium (air) to a denser medium (glass), it slows down and bends towards the normal.

💡 Quick Tip

Light bends towards the normal when moving into a denser medium.