West Bengal Madhyamik Board Class 10 Physical Science 2016 Question Paper

Group-A

1. Write short answers for any ten of the following questions: **[1x10=10]**

   1.1 Which particle is present in equal number in $^{14}_{6}C$ and $^{16}_{8}O$?

   1.2 What will be the difference of temperature of two bodies in the Kelvin scale if their temperature difference in the Celsius scale is 10°?

   1.3 What is the maximum number of electrons that can be present in the M shell of an atom?

   1.4 What is the mass in gram of 2.24 litre of N_2 at STP? (N=14)

   1.5 The mass and specific heat of a body are respectively m gram and s cal/g/°C. What is the water equivalent of the body in CGS unit?

   1.6 From which part of the atom is the β- ray emitted?

   1.7 What type of lens converts a parallel beam of light into a divergent beam?

   1.8 What is the angle between the magnetic field and electric field in Fleming's left-hand rule?

   1.9 What type of chemical bond is present between oxygen and hydrogen atoms in water molecules?

   1.10 Which is the most electronegative element?

   1.11 Which gas is evolved when aluminium is heated with an aqueous solution of sodium hydroxide?

   1.12 Write the formula of the precipitate formed when an aqueous solution of barium chloride is added to dilute sulphuric acid.

   1.13 What is the number of hydrogen atoms in an alkane having n number of carbon atoms?

GROUP- B

2.1 The outermost shell of an atom of an element is M, and it contains 6 electrons. How many electrons are there in the K and L shell of the atom?
If the number of protons and neutrons in the nucleus of the above atom is the same, then what would be its atomic number and mass number of the atom?

2.2 Write down the three postulates of Dalton's atomic theory.

2.3 If $^{40}_{20}Ca$ and $^{37}_{17}Cl$ from Ca^{2+} and Cl^- respectively, then the number of which two particles remain the same in the two ions?

3.1 State Charles' law and express it in Mathematical form.

3.2 How do the temperature and pressure of a gas depend on the motion of the gas molecules?

3.3 A gas of volume 91 cm³ at STP is heated at a temperature of 27 °C. If the pressure is kept constant, what will be the volume of that gas at that temperature?

4.1 The number of molecules in 1 mole is the same for the three compounds CO, C_2H_4 and NO. The number of molecules present in 1g is the same for two of the above compounds, while it is different for the remaining compound. Identify the compound. Find out the number of molecules present in 1g of this compound. Which one of the three compounds has the maximum number of atoms in 1g of the compound? [H=1, C=12, N=14, O=16]

4.2 Write with an example what is meant by gram atomic mass.

4.3 How many grams of magnesium oxide is produced when 24 gram of magnesium is completely burnt in oxygen? [Mg=24, O=16]

5.1 What is meant by absolute zero temperature? What is the Kelvin scale of temperature?

5.2 What is the number of oxygen atoms in 2.24 L of CO_2 at STP?

5.3 A Cl⁻¹ ion is produced from $^{37}_{17}Cl$ **and another Cl⁻ion is produced from** $^{35}_{17}\dot{Cl}$. **The number of which particle is different from the two Cl⁻ ions? What is the relation between** $^{37}_{17}Cl$ **and** $^{35}_{17}\dot{Cl}$**?**

GROUP-C

6.1 Find the temperature at which the reading of Celsius and Fahrenheit scales will be the same.

6.2 Define specific heat.

6.3.1 What will happen when two bodies at different temperatures come in contact with each other?

6.3.2 Write down the SI units of thermal capacity and water equivalent.

7.1.1 Is the lens of a magnifying glass, convex or concave?

7.1.2 What is meant by the optical centre of a convex lens?

7.2 What is a pure and impure spectra? Is rainbow a pure or an impure spectrum?

7.3 If white light is passed through a prism, the light of which colour is deviated most and the light of which colour is deviated the least?

8.1 What will be the length of the image when the length of the object is 5 cm and its linear magnification is 1.5?

8.2 What is meant by resistivity? How does the resistance of a conducting wire depend on its diameter?

8.3 If the resistances of 3 ohm, 4 ohm and 5 ohm are connected to a cell in parallel combination, through which resistance will flow the highest current and through which resistance will flow the lowest current?

9.1.1 The heat generated by the passage of electric current through a metallic conductor is 800 J. If the current is 1A and the resistance of the conductor is 20 ohm, determine the time for which electricity was passed through the wire.

9.1.2 Mention two differences between potential difference and electromotive force.

9.2 It is written '220V-60W' on a bulb. What does it mean?

9.3 Explain why household electrical appliances are connected in a parallel combination.

10.1 What effects on the rotation of a Barlow's wheel will be seen if (i) the position of the poles of the magnet is reversed (ii) current is increased?

10.2 Mention three ways by which the strength of an electromagnet can be increased.

10.3.1 Name an instrument where an electromagnet is used.

10.3.2 Why is 'earthing' necessary?

11.1 Why is a diode called a valve?

11.2 Mention the principle of production of x-rays.

11.3.1 Arrange α. B and γ rays in increasing order of penetrating power. Which one has the highest electric charge?

11.3.2 Mention two characteristics of Nuclear fission.

GROUP-D

12.1 17 electrons and 18 neutrons are present element. By the number of which particle the position of the element cannot be determined in the Mendeleev's Periodic table? The element belongs to which period and to which group in the Mendeleev's periodic table?

12. 2 In the light of the electronic theory of oxidation-reduction, identify which one of the following is oxidation and which one is reduction series?
$Ca \rightarrow Ca^{2+} + 2e$
$O + 2e \rightarrow O^{2-}$

12.3 How many elements are present in the second period of the long form of that periodic table? What is the name of the last element of that period? To which group does the element belong?

13.1 Mention two differences between organic and inorganic compounds.

13.2 What is the monomer of PVC? Mention one use of PVC.

13.3 Match the right column with the left column:

Left Column	Right Column
1. The number of carbon-carbon bond in acetylene molecules.	i. Smaller
2. The size of Na atom in comparison to that of Li atom.	ii. Methane
3. Duralumin contains	iii. Carbon
4. The number of electrons in the outermost shell of neon	iv. Cu
5. The size of chlorine atom in comparison to that of bromine atom	v. Larger
6. Every organic compound contains	vi. Eight
7. Polymer is formed by	vii. Three
8. Responsible for the formation of will-o'-the wisp.	viii. Ethylene

14.1 Mention the following points for the laboratory preparation of nitric acid:
   i) starting chemicals
   ii) balanced chemical equation of the chemicals' reaction

How is the nitric acid prepared in the laboratory collected?

14.2 What are used as electrolyte, cathode and anode for electroplating of nickel on an iron spoon in the electrolytic method?

14.3 Give an example of dehydrating property of concentrated sulphuric acid with balanced chemical equation.

15.1.1 Define an ore.

**15.1.2 Give one example each of ore of magnesium and zinc.**

15.2 What type of chemical bond is formed by complete transfer of electrons from one atom to another atom? Show by an example.

15.3 Mention one use of each of the following two substances:
      i) urea
     ii) methylated spirit

16.1 Mention three sources of air pollutant sulphur dioxide gas. Mention one harmful effect of the presence of excess sulphur dioxide in the atmosphere.

16.2 How will you convert?
$HC \equiv CH \rightarrow CH_3CH_3$
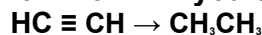
16.3 Write the formula of the functional group present in the following two compounds: ethyl alcohol, acetaldehyde

17.1 The molecular formula of an organic compound is C_2H_4. It decolourises the colour of bromine dissolved in tetra chloride. Identify the organic compound.

17.2 Write the balanced chemical equation for the first step of the Substitution reaction of methane with chlorine in diffused sunlight.

17.3 Write with balanced chemical equation what happens when:
    i) iron powder is added to dilute hydrochloric acid
   ii) Zinc dust is boiled with concentrated aqueous solution of sodium hydroxide

GROUP-E
[Only for External Candidates]

18. Answer any five from the following questions.   **[2x5=10]**

18.1 If V litre of O_2 gas contains n number of O_2 molecules at STP, what will be the number of SO_2 and H_2 molecules present respectively in V/2 litre of SO_2 gas and 2V litre of H_2 gas at STP?

18.2 Arrange proton, neutron and electron m in decreasing order of their masses.

18.3 How are ammeter and voltmeter connected in an electric circuit?

18.4 What is a lens?

18.5 What is fuming sulphuric acid?

18.6 What type of chemical bond is present in hydrogen chloride? Show by drawing electron-dot structure.

18.7 Mention one use each of methane and acetylene.