LOYOLA SCHOOL, BHUBANESWAR

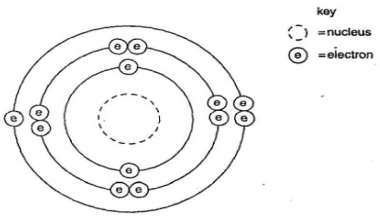
Half Yearly Evaluation, September- 2025

Class: IX **Subject: Chemistry** **F.M. = 80** **Time: 2 Hrs.**

SECTION A

Question 01

Choose the correct option from the choices given: A, B, C and D. **[15]**



(i) Find out the incorrect statement about the structure given.

Statement 1: The electronic configuration is 2, 8, 3.

Statement 2: It donates 3 electrons and is a metal.

Statement 3: It can combine with two chlorine atoms.

(A) Statement 1 (B) Statement 2 (C) Statement 3 (D) None of these.

(ii) Electronic configuration of atom -X = 2, 7 Electronic configuration of atom - Y = 2, 4.

The incorrect statement related to the above:

Statement 1: XY forms a covalent compound.

Statement 2: X shares its 1 electron and Y shares its 4 electrons.

Statement 3: X would have a pair of lone pairs

(A) Statement 1 (B) Statement 2 (C) Statement 3 (D) None of these.

(iii) X and Y are two isotopes of an element E.

Which statement is correct about X and Y?

Statement 1: X & Y have the same protons and the different mass numbers.

Statement 2: X & Y have the same proton and neutron numbers.

Statement 3: X & Y have the same proton numbers and exhibit different chemical properties.

(A) Statement 1 (B) Statement 2 (C) Statement 3 (D) None of these.

(iv) The chemistry teacher asked the children to find out the commonality in the three particles K^+, Ar, Cl^-.

Find out whose statement is incorrect.

(A) Akash said that they have the same electronic configuration.

(B) Adyan said that they are chemically inert.

(C) Akhara said that they exhibit the same physical properties.

(D) Anwesha said that all three have an octet configuration.

(v) Mahi heated a white substance and recorded the following observations.

Observation 1: A buff yellow residue is formed.

Observation 2: A reddish brown fume is evolved.

Observation 3: A lighted splinter rekindles when inserted into the test tube

The white substance, Mahi must infer, is:

(A) Zinc nitrate (B) Lead nitrate (C) Zinc carbonate (D) Lead carbonate

(vi) In which case, the displacement reaction takes place.

P. Metals above the hydrogen in the activity series and dilute acid reaction.

Q. Metals below hydrogen in the activity series and dilute acid reaction.

(A) P (B) Q (C) R (D) All of these

(vii) A metal X is placed in a blue metal sulphate solution. A pink coating appears over the metal X.

The metal X may be:

(A) Fe (B) Hg (C) Ag (D) Au.

(viii) The formula of salt is $M_2(SO_4)_3$. Its bisulfite is:

(A) $M(HSO_4)_2$ (B) $M_2(HSO_4)_3$ (C) $M_3(HSO_3)_2$ (D) $M(HSO_3)_3$

(ix) The electronic configuration of an atom X is 2, 8, 6. Its stable state is:
(A) X (B) X^{6-} (C) X^{2-} (D) X^{2+}

(x) Neena prepared a saturated solution at 90°C with 30g of solute in 100g. of water. She cooled down the solution very slowly up to 50°C, then continued to cool slowly up to 20°C.

(i) At 50°C, Neena would get:
(A) A saturated solution (B) An unsaturated solution
(C) A supersaturated solution (D) Crystals

(ii) At 20 °C, Neena would get:
(A) A saturated solution (B) An unsaturated solution
(C) Crystals (D) None of these.

(xi) Anwesha collected water from a tube well for washing purposes. When she started to wash the clothes using soap got no lather. So she decided to convert the water into something useful for washing in one attempt. Which one will be the best way to convert?
P. Anwesha should boil the water for some time.
Q. Anwesha should boil the water with washing soda.
(A) P (B) Q (C) Both ways are correct (D) Both ways are not helpful.

(xii) X is a crystalline solid exposed to air for a long time, and recorded the following observations.
Observation 1: Crystals crumble to powder.
Observation 2: It lost some weight when measured.
The property of X is:
(A) Deliquescence (B) Deliquescent (C) Efflorescence (D) Efflorescent

(xiii) A blue crystal released reddish brown fumes when heated in a dry test tube, leaving behind a black residue. The type of reaction it undergoes is:
(A) Thermal decomposition (B) Thermal dissociation
(C) Displacement reaction (D) Direct combination reaction.

(xiv) The RMM of sulphuric acid is:
(A) 80 (B) 95 (C) 97 (D) 98

Question 2:

(a) Pius is asked to identify two white salts, X and Y, using thermal decomposition. Pius heated both White salts in two dry test tubes separately. Pius observed and recorded the following.
Obs. 1. Reddish brown fumes were evolved in both cases.
Obs. 2. Glowing splinter relights when introduced in test tubes.
Obs 3. The residue X is yellow in both hot and cold conditions, and the residue Y is yellow when hot and white in cold conditions.
Answer the following questions related to the experiments.
(i) Which observation is useful to identify X and Y?
(ii) Identify X and Y.
(iii) Name the substance: reddish brown fumes.
(iv) Which gas is confirmed in observation 2?

(b) State one observation for the following:

(i) When ammonium dichromate is heated.
(ii) Iron(III) chloride salt is exposed to air.
(iii) Zinc nitrate is heated.
(iv) Iodine is heated.
(v) A soda bottle cap is opened.

(c) Name the gas that evolved in each of the following cases: **[5]**

(i) Calcium carbonate is heated strongly.
(ii) Sodium nitrate is heated strongly.
(iii) Ammonium nitrate is heated strongly.
(iv) Ammonium dichromate is heated strongly.
(v) Lead nitrate is heated strongly. (Other than NO_2)

(d) Give a reason for each of the following: **[5]**

(i) Why should an equation be balanced?
(ii) Silver salts are kept in dark-coloured bottles.
(iii) Ordinary soap is wasted in hard water.
(iv) Isotopes of chlorine exhibit the same chemical properties.
(v) Caustic alkalis are kept in a air tight bottle.

(e) Fill in the blanks with the correct choice given in brackets: **[5]**

(i) A _____is a group of atoms of elements that behave like a single unit & show a valence.
(valence, variable valence, radical)
(ii) A chemical reaction which proceeds with the absorption of energy is called_____
(exothermic/endothermic) reaction, whereas the evolution of energy is called_____
(exothermic/endothermic) reaction.
(iii) Number of bond pairs in ammonia is _____ (1/ 2 /3)
(iv) Protons and neutrons are collectively called_____(nuclei/ nucleons).

SECTION B (ATTEMPT ANY FOUR QUESTIONS)

Question 3:

(a) Write the name of the following radicals. **[3]**

(i) ZnO_2^{2-} (ii) AlO_2^- (iii) CrO_4^{2-}

(b) Name the type of reaction. **[3]**

(i) The type of reaction in which two elements combine to form a compound.
(ii) The type of reaction in which a compound splits into two or more substances due to the application of energy.
(iii) The type of reaction in which an active element displaces the least active element.

(c) Differentiate in one point: **[4]**

(i) Saturated solution and unsaturated solution
(ii) Hydrated substances and anhydrous substances.
(iii) Deliquescent substances and efflorescent substances.
(iv) Temporary hard water and permanent hard water.

Question 4:

(a) Four elements 'A', 'B', 'C', 'D' are given: **[6]**

1. 'A' shows the presence of 11 protons, 10 electrons, and 12 neutrons.
2. 'B' shows the presence of 6 protons, 6 electrons, and 6 neutrons.
3. 'C' shows the presence of 17 protons, 18 electrons, and 18 neutrons.
4. 'D' shows the presence of 6 protons, 6 electrons, and 8 neutrons.

Answer the following questions related to the above:

(i) Which two atoms are isotopes?
(ii) Which is a cation?
(iii) Which one is an anion?
(iv) Write two molecular formulas of two molecules using the above symbols.
(v) State the type of bonds present in the above 2 - molecules.

(b) Draw the orbit structure for each of the following compounds: **[4]**

(i) Sodium chloride. [Na = 23, Cl = 35]
(ii) Hydrogen chloride. [H = 1, Cl = 35]

Question 5:

(a) Write the molecular formula for the following: **[3]**

(i) Ammonium sulphate (ii) Calcium silicate (iii) Aluminium nitride

(b) Write a balanced equation for the following: **[3]**

(i) Copper nitrate is heated strongly.
(ii) Washing soda is exposed to air.
(iii) Temporary hard water is boiled for some time.

(c) Linnet kept two white solids, X and Y, in watch glasses in her demo table drawer in a practical class. In the next practical class, she opened the drawer and observed the following. [4]

1. Only 'X' turns moist, but not 'Y'.
2. Only 'Y' turns to powder, but not 'X'.

Answer the following questions related to the above observations.

(i) What properties of X and Y did Linnet record?
(ii) If X is an alkali. What would it be?
(iii) Which one is a hydrated crystal?

Question 6:

(a) How do you identify using a single test? **[3]**

(i) A saturated solution and an unsaturated solution.
(ii) Lead nitrate and zinc nitrate.
(iii) Hard water and soft water.

(b) Balance the following equations: **[3]**

(i) $C + HNO_3 \rightarrow CO_2 + H_2O + NO_2$
(ii) $S + HNO_3 \rightarrow H_2SO_4 + H_2O + NO_2$
(iii) $P + HNO_3 \rightarrow H_3PO_4 + H_2O + NO_2$

(c) Saishreeya performed an experiment in which she added zinc granules to a light green solution. After 2 hours, she recorded a colourless solution. [4]

(i) What type of reaction did Saishreeya perform?

(ii) Which metal is more reactive, if the green solution is an iron(II) sulphate solution?

(iii) Why does it turn colourless?

(iv) What would be Saishreeya's observation if she replaced Iron (II) sulphate with copper sulphate solution.

Question 7:

(a) **(i)** What is the difference in subatomic particles between two isotopes of an element? [1 + 2]

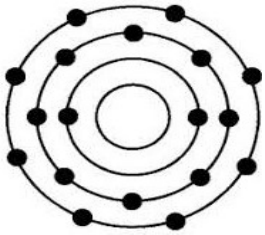
(ii) Draw the atomic structure of isotopes of Cl – 35 and Cl – 37.

(b) Calculate % of water of crystallisation in Bauxite. (Al_2O_3. $2H_2O$) [At. Wt. Al = 27, O = 16, H = 1] [3]

(c) Write a statement with clarity about the following notation used in an equation. [4]

(i) aq. (ii) $\overset{\Delta}{\rightarrow}$ (iii) $\downarrow$ (iv) $+ \Delta$

Question 8:



(a) Study the diagram and answer the following. [3]

(i) Identify the atom.

(ii) What type of atom is this?

(iii) State a line regarding its chemical reactivity.

(b) State the type of the reaction. [3]

(i) The temporary hard water is boiled.

(ii) The type of reaction in which radicals of two solutions are exchanged and aninsoluble salt is formed.

(iii) The type of reaction in which carbonic acid is formed due to the dissolution ofcarbon dioxide in water.

(c) State: [4]

(i) Two information provided by a chemical equation.

(ii) Two limitations of a chemical equation.

********** **ALL THE BEST**********