DELHI PUBLIC SCHOOL NEWTOWN

SESSION: 2022-23

HALF YEARLY EXAMINATION

CLASS: IX **FULL MARKS: 80**

SUBJECT: CHEMISTRY [SET B] **DATE: 30.08.2022**

General Instructions:

- **The paper consists of six printed pages.**
- **Section A is compulsory. Attempt *any four* questions from Section B.**
- **Answers should be to the point.**
- **Question numbers should be copied carefully while answering the questions.**

SECTION A

(Attempt all questions from this section)

Question 1

Choose one correct answer to the questions from the given options: **[15]**

i) The molecular formula of Ammonium phosphate is:

(a) NH_4PO_3

(b) $NH_4(PO_3)_2$

(c) $(NH_4)_3PO_4$

(d) $(NH_4)_3(PO_4)_2$

ii) A divalent metal which displaces hydrogen from cold water is:

(a) Sodium

(b) Calcium

(c) Iron

(d) Zinc

iii) An anion having a metallic element in it is:

(a) Aluminate

(b) Phosphate

(c) Borate

(d) Chlorite

iv) The chemical name of HCOOK is:

(a) Potassium carbonate

(b) Potassium formate

(c) Potassium acetate

(d) Potassium oxalate

v) The substance used to remove phosphine from hydrogen is:

(a) Anhydrous calcium chloride

(b) Potassium hydroxide solution

(c) Silver nitrate solution

(d) Lead nitrate solution

vi) The salt which on reaction with sodium hydroxide gives a dirty green precipitate is:

(a) Ferric sulphate

(b) Copper sulphate

(c) Zinc sulphate

(d) Ferrous sulphate

vii) The metal which react with copper sulphate to give a reddish brown residue is:

(a) Silver

(b) Iron

(c) Mercury

(d) Platinum

viii) The symbolic representation of sub atomic particles is:

(a) $_1n^0$,$+_1p^0$,$-_1e^1$

(b) $+_1p^1$, $_1n^0$,$-_1e^0$

(c) $-_1e^0$, $_0n^1$,$_1p^{+1}$

(d) $-_1e^0$, $+_1p^1$, $_0n^1$

ix) An atom has 18 neutrons, 17 protons. Select the correct option which fits well for the valency and type of the element respectively

(a) +1, metal

(b) -1, non metal

(c) 0, noble gas

(d) 2+, metal

x) An atom $_{19}X^{39}$ having unstable electronic configuration forms a compound with $_{16}Y^{32}$. The bond formed is ___ and the formula of the compound is ____.

(a) electrovalent, X_2Y

(b) electrovalent, XY_2

(c) covalent, X_2Y

(d) covalent, XY_3

xi) At constant pressure, if the temperature is tripled for a fixed mass of a gas then its volume will become:

(a) 6 times

(b) 1/3 times

(c) 3 times

(d) no change

xii) Gas that turns lead acetate paper silvery black and it evolved with rotten egg smell is:

(a) Carbon monoxide

(b) Carbon dioxide

(c) Hydrogen

(d) Hydrogen sulphide

xiii) When the precipitation takes place between Sodium hydroxide and zinc chloride, the colour of the precipitate formed is:

(a) whitish grey

(b) bluish white

(c) dense white

(d) gelatinous white

xiv) Which of the following pairs represent two atoms with the same number of neutrons?

(a) $_{9}F^{19}$ and $_{10}Ne^{20}$

(b) $_{6}C^{12}$ and $_{12}Mg^{24}$

(c) $_{11}Na^{23}$ and $_{19}K^{39}$

(d) $_{27}Co^{59}$and $_{28}Ni^{59}$

xv) STP conditions:

(a) 273K, 270mm Hg

(b) 273K, 760mm Hg

(c) 0°C, 76mm Hg

(d) 273K, 76mm Hg

Question 2

i) Write the formula for the following compounds: [5]

(a) Magnesium nitrite

(b) Sodium peroxide

(c) Potassium chromate

(d) Ammonium carbonate

(e) Sodium permanganate

ii) Balance the following equations: [5]

(a) $Pb_3O_4 + HCl \rightarrow PbCl_2 + H_2O + Cl_2$

(b) $AlN + H_2O \rightarrow Al(OH)_3 + NH_3$

(c) $CuS + O_2 \rightarrow CuO + SO_2$

(d) $NH_3 + Cl_2 \rightarrow N_2 + NH_4Cl$

(e) $C_2H_6 + O_2 \rightarrow CO_2 + H_2O$

iii) State one appropriate observation for the following chemical reaction taking place: [5]

(a) Barium chloride solution is added to an aqueous solution of sodium sulphate.

(b) Sulphur dioxide is added to acidified potassium dichromate solution.

(c) Ammonium chloride and calcium hydroxide is heated gently in a test tube.

(d) Lead (II) carbonate is heated in a test tube.

(e) Ferric sulphate solution is made to react with sodium hydroxide solution.

iv) Solve the following numericals : [5]

(a) A certain volume of gas at 27°C, 1atm pressure occupies a volume of 25 m^3. If the pressure is kept constant and the temperature is raised to 77°C, what would be the volume of the gas

(b) If at constant temperature 10mL of a gas is at pressure of 1 atm and we double the pressure, what will be the new volume of the gas?

v) When white sample [M] is strongly heated, it produces a residue [N] which is yellow when hot and white when cold. The heating also produces a neutral gas [O] which rekindles a glowing wooden splinter and a reddish brown acidic gas [P] which has an irritating odour and dissolves in water to produce two acids.

(a) Identify M, N, O and P.

(b) Write a balanced chemical equation for the heating of the compound M. [5]

SECTION B

Attempt any four questions

Question 3

i) Complete the table given below. [5]

Atom	Mass no	Atomic no	No of Neutrons
$_{19}K^{39}$	i) _____	19	ii) _____
$_{5}B^{10}$	10	iii) _____	iv) _____
$_{20}Ca^{40}$	v) _____	20	20

ii) Give reasons for the following: [5]

(a) Inert gases are unreactive.

(b) Atomic mass of chlorine is fractional and not in whole numbers.

(c) It is necessary to compare the gases at STP.

(d) Nitric acid is not used during the laboratory preparation of hydrogen.

(e) Silver bromide salt is kept in dark coloured bottles.

Question 4

i) The formula of sulphide of a metal M is M_2S_3. Write down the formula of its : [4]

(a) Bisulphite

(b) Oxalate

(c) chlorate

(d) bromide

ii) **Electronic configuration of an atom X is (2, 8, 7). It combines with another atom Y having atomic number 12.** **[4]**

(a) **Write the electronic configuration of Y**

(b) **Write the formula of the compound formed.**

(c) **What type of bond will be formed between X and Y?**

(d) **Draw the electron dot cross diagram to represent the formation of the above compound.**

iii) **Name the law that studies the relationship between the absolute temperature (T) and volume (V) of a fixed mass of a dry gas at constant pressure. Also represent it graphically (V vs T).** **[2]**

Question 5

i) **A gas at constant temperature is at a pressure of 1080mm Hg. If the volume is decreased by 40%,**

(a) **Find its volume at $127^{O}C$.**

(b) **State the law that obeys the above statement.**

(c) **Give its mathematical expression.** **[5]**

ii) **Elements A, B and C have atomic numbers 10, 11, 17 respectively.**

(a) **Identify a metal, non metal and inert gas among these.**

(b) **Write the formula of the compound formed in between the metal and non metal.**

(c) **Draw the orbit diagram for the compound formed above.** **[5]**

Question 6

i) **With respect to the industrial preparation of hydrogen answer the following:** **[5]**

(a) **Write the chemical equation for the reaction where heat is absorbed.**

(b) **Name the catalyst and promoter used in this process.**

(c) **Write an equation for the catalysed reaction taking place.**

(d) **How is unused carbon dioxide removed from the hydrogen formed?**

ii) **A hydrate of magnesium sulphate $MgSO_4.7H_2O$ contains water of crystallization. Calculate the mass percent of water of crystallisation. [Mg=24, S=32, O=16, H=1]** **[2]**

iii) **Complete the oxidation- reduction reactions:**

(a) **$Pb^{2+} \rightarrow Pb^{4+}$**

(b) **$Hg^{2+} \rightarrow Hg$**

(c) **$F^{-} \rightarrow F$** **[3]**

Question 7

i) Calculate the volume of ammonia gas at STP which at 17^0C and pressure of 740mm of mercury occupies a volume of 6.4cc. [3]

ii) Write balanced equations for the following conversions: [3]

(a) Copper (II) nitrate to Copper (II) oxide

(b) Zinc to potassium zincate

(c) Magnesium to magnesium sulphate

iii) Differentiate between the following terms: [4]

(a) Endothermic and exothermic reaction(definition)

(b) Neutralization and precipitation reaction(Equation)

(c) Atomic number and mass number(definition)

(d) Oxidation and reduction (in term of loss or gain of electrons)

Question 8

i) In the given figure: [5]

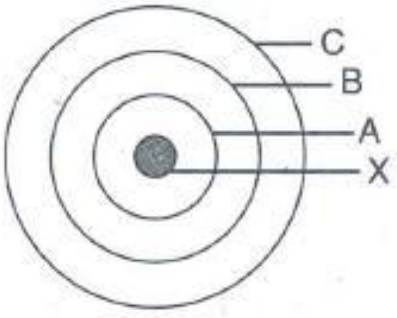
(a) Which shell has maximum energy?

(b) What are the particles present in X?

(c) State the charge of X.

(d) Maximum number of electrons B can have.

(e) If C has 2 electrons, state whether it forms a cation or an anion.



ii) A small piece of iron metal is put into a small trough containing steam. There is an effervescence of gas. [5]

(a) Name the gas formed in the reaction.

(b) Give one chemical test for the identification of the gas.

(c) Write an equation for the reaction taking place.

(d) State the type of reaction taking place.

(e) What will be the compound formed when this gas reacts with nitrogen?