DELHI PUBLIC SCHOOL NEWTOWN
SESSION: 2022-23
FINAL EXAMINATION

CLASS: IX **FULL MARKS: 80**
SUBJECT: CHEMISTRY [SET A] **TIME: 2 HOURS**

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

i) The external agent required to decompose acidified water into its constituent elements is:
- **(a) Heat**
- **(b) Light**
- **(c) Electricity**
- **(d) Reducing agent**

ii) A deliquescent alkali:
- **(a) Calcium chloride**
- **(b) Glauber's salt**
- **(c) Magnesium oxide**
- **(d) Sodium hydroxide**

iii) An atom A [$_{12}A^{24}$] and an atom B [$_{8}B^{16}$] are present. The formula of the compound formed between them are:
- **(a) AB**
- **(b) A_2B**
- **(c) AB_3**
- **(d) A_3B**

iv) The element of the third period group 16 is:
- **(a) Neon**
- **(b) Oxygen**
- **(c) Chlorine**
- **(d) Sulphur**

v) A metal that displaces hydrogen from steam leaving behind an amphoteric oxide is:

(a) Sodium
(b) Aluminium
(c) Iron
(d) Copper

vi) The law illustrated by the equation V/ T = K for a given mass of a dry gas at constant pressure is:

(a) Boyle's Law
(b) Charle's Law
(c) Avogadro's Law
(d) Ideal Gas Law

vii) Ozone is formed by the combination of:

(a) An oxygen molecule with a nascent oxygen atom
(b) Two nascent oxygen atoms and an oxygen molecule
(c) Two molecules of oxygen
(d) Two nascent oxygen atoms and two oxygen molecules

viii) The valency of nitrogen in the compound nitrogen monoxide is:

(a) +1
(b) +2
(c) +3
(d) +4

ix) The subatomic particle with a negative charge and negligible mass is :

(a) Proton
(b) Neutron
(c) Electron
(d) Nucleon

x) The chloride exhibiting covalent bonding is:

(a) Phosphorus trichloride
(b) Magnesium chloride
(c) Calcium chloride
(d) Sodium chloride

xi) A substance which on heating leaves no residue in the test tube is:

(a) Ammonium dichromate
(b) Ammonium chloride
(c) Lead nitrate
(d) Lead carbonate

xii) An efflorescent heptahydrate salt is:

(a) Gypsum
(b) Lime salt petre
(c) Glauber's salt
(d) Epsom salt

xiii) Hardness in water both temporary and permanent can be removed by addition of the following substance, followed by boiling and filtration:

(a) Calcium carbonate
(b) Sodium bicarbonate
(c) Sodium carbonate
(d) Magnesium carbonate

xiv) A non-renewable source of energy fuel used instead of fossil fuel to reduce green house gas pollution is:

(a) CNG
(b) Hydrogen energy
(c) Biogas
(d) Hydro power

xv) The formula of calcium formate is:

(a) HCOOCa
(b) $Ca_2H_2CO_2$
(c) $CaO_2H_2C_2$
(d) $(HCOO)_2Ca$

Question 2

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

(a) Sodium silicate
(b) Potassium hypochlorite
(c) Cupric phosphate
(d) Magnesium nitrite
(e) Stannic bromide

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

(a) Hydrogen gas is passed through copper (II) oxide.
(b) Cold water is added to a piece of calcium metal.
(c) Hydrogen sulphide gas is passed through moist lead acetate paper.
(d) Blue vitriol is heated strongly.
(e) Mercuric oxide is heated in a test tube.

iii) Give balanced equations for the following reactions/ conversions. (mention conditions wherever necessary): [5]

(a) Preparation of hydrogen from zinc using sodium hydroxide.
(b) Calcium chloride to calcium carbonate.
(c) Reduction of steam to hydrogen by carbon monoxide.
(d) Addition of conc. sulphuric acid to glucose.
(e) Action of heat on silver nitrate.

iv) Give appropriate reason for the following statements: [5]

(a) Hydrogen can be prepared from dilute sulphuric acid using zinc but not lead.
(b) Both precipitation and neutralization reactions are considered as double decomposition reactions.
(c) Physical properties of the isotopes of chlorine are different, but its chemical properties are similar.
(d) Fused calcium chloride is used in desiccator.

(e) Highly electropositive metals are not used in place of zinc in the laboratory preparation of hydrogen.

v) Solve the following numerical problems: [5]

(a) What temperature would be required to reduce the volume of a gas to 1/6th the initial volume at constant pressure if the gas was originally at STP conditions?

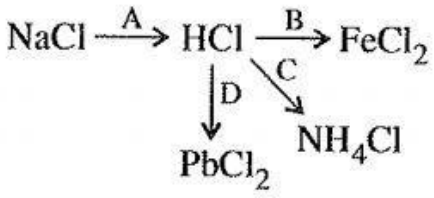
(b) A gas occupies a volume of 255 mL at 3.2 atm pressure and 27°C. Calculate the pressure to reduce its volume to 160mL at 300 K.

SECTION B

(Attempt any four questions from this section)

Question 3

i) Give balanced equations for the following conversions A to D.



ii) Calculate the volume of a gas X at STP if it occupies 380 litres at 300 K and 70 cm of mercury.

iii) A part of the periodic table is shown below with one element missing:

H							**He**
Li	**Be**	**B**	**C**	**N**	**O**	**F**	**Ne**
Na	**Mg**	**Al**	**Si**	**–**	**S**	**Cl**	**Ar**
K	**Ca**						

Based on the above table, answer the following questions:

(a) Name the element that has duplet structure.

(b) Name the lightest alkali metal.

(c) Identify the missing element. [4+3+3=10]

Question 4

i) State if the solubility increases, increases slightly, decreases or remains the same with rise intemperature for each of the following compounds:

(a) Calcium sulphate

(b) Potassium nitrate

(c) Sodium chloride

(d) Ammonium chloride

ii) (a) Draw the atomic orbit structure of formation of: Sodium chloride [Na=11, Cl=17]

(b) Name a covalent molecule formed from two different elements, having three single covalent bonds. Also draw the electron dot diagram for it.

iii) (a) Name the industrial method for the production of hydrogen gas.
(b) Name the catalyst used in the above process.
(c) Write the balanced chemical equation for the production of water gas.
[4+3+3=10]

Question 5

i) Complete the following reactions and state whether it is oxidation or reduction reaction?
(a) $K \rightarrow K^{+}$
(b) $Mn^{7+} \rightarrow Mn^{5+}$
(c) $Cl^{-} \rightarrow Cl$
(d) $O \rightarrow O^{2-}$

ii) Following questions are related to the elements of group 2.
(a) What are the elements of this group collectively called?
(b) Name the element of this group belonging to period 3.
(c) Which type of chlorides (ionic/ covalent) is formed by the element of this group?

iii) Give balanced equations for the conversion of nitrogen to nitric acid- a constituent of acid rain. [4+3+3=10]

Question 6

i) Calculate the percentage of hydrogen in each of the following:
(a) Ammonium dichromate
(b) Hydrated Copper sulphate [H = 1, N = 14, O = 16, S = 32, Cr = 52, Cu = 64]

ii) Name the following:
(a) A metal which on reacting with dilute nitric acid produces hydrogen
(b) The reagent used to remove hydrogen sulphide from hydrogen gas prepared in the laboratory.
(c) The impurity associated with granulated zinc that acts as a catalyst for the laboratory preparation of hydrogen gas.

iii) Rewrite the following statements correctly wherever necessary.
(a) The second period has elements lithium to neon filling upto two electrons in their L shell.
(b) The element in period 3 which is a monoatomic unreactive gas is neon.
(c) Phosphorus is present in period 5 group 13. [4+3+3=10]

Question 7

i) A certain volume of the gas was found to be at a pressure of 1200 mm of mercury. When the pressure was decreased by 500 mm the gas occupied a volume of 2400 cm^3.
(a) Calculate the initial volume occupied by the gas if the change was done at constant temperature?
(b) State the law that is obeyed by the gas. Also represent it graphically.

ii) Fill in the blanks with the correct words in the bracket:- In the displacement reactions $X + YZ \rightarrow Y + XZ$
(a) The element ____[Y/X] has replaced another element _____[Y/ X/ Z]

in a compound.

(b) The ability of an element, to displace another is determined by its relative position in the _____(activity/ chemical) series.

iii) Account for the following statements:

(a) Table salt becomes moist and sticky during the rainy season.

(b) A white powder forms on the surface of washing soda crystals which are left exposed to the air.

(c) Hard water is unsafe for drinking. [4+3+3=10]

Question 8

i) The electronic configuration of elements A, B and C are (2,8, 8, 1), (2,7) & (2, 8, 18, 6) respectively.

(a) Write down the formula of a molecule of B.

(b) Write the formula of the compound formed between A and C.

(c) Which two elements belong to same period?

(d) Which of the element is a good conductor of electricity?

ii) Name the following:

(a) Decomposes in presence of sound.

(b) A metal which reacts reversibly with steam.

(c) A gas that turns Nessler's reagent brown.

iii) How would you distinguish between the following:

(a) Carbon dioxide and sulphur dioxide (by using acidified potassium dichromate paper).

(b) Copper carbonate and lead carbonate (by heating).

(c) Sodium chloride and potassium nitrate (by flame test). [4+3+3=10]