GREENLAWNS SCHOOL, WORLI

PRELIMINARY EXAMINATION: 2023-24

CHEMISTRY

Std: X | Marks: 80

Date: 12/01/2024 | Time: 2 hrs

Answers to this paper must be written on the paper provided separately. You will **not** be allowed to write during the first **15** minutes. This time is to be spent in reading the Question paper. The time given at the head of this paper is the time allowed for writing the answers. **Section A** is compulsory. Attempt **any four** questions from **Section B**. The intended marks for questions or parts of questions are given in brackets [ ].

SECTION A

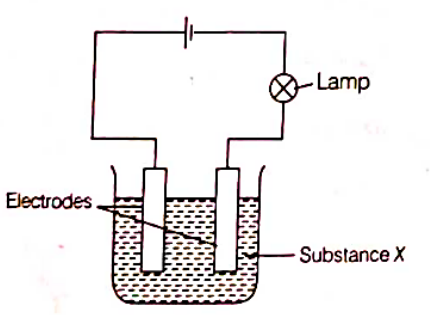
*(Attempt **all** questions from this Section)*

Question 1

Choose the correct answers to the questions from the given options. [15]

(Do not copy the question, write the correct answers only.)

(i) In a circuit lamp, the lamp lights up:



What could X be?

(a) A solution of alcohol and water
(b) A solution of sodium chloride in water
(c) Sugar solution
(d) Solid Potassium chloride

(ii) Which of the following is correct about an element with Atomic number = 18:

(a) Radioactive
(b) Metal
(c) Metalloids
(d) Inert gas

(iii) If an element has low ionisation energy, then it is likely to be:

(a) Metallic
(b) Non – metallic
(c) Acidic
(d) Metalloids

(iv) The percentage of oxygen in the compound CH_2O is (C=12, H=1, O=16):
(a) 13.33%
(b) 33.33%
(c) 53.33%
(d) 73.33%

(v) The table below gives information about six elements A to F:

	Electronic Configuration		Formula of compound
W	A: 2,1	B: 2,6	A_2B
X	B: 2,6	C: 2, 7	B_2C
Y	C: 2, 7	D: 2, 8, 3	DC_3
Z	E: 2, 8, 6	F: 2, 8, 8, 2	FE

Identify the compound which is wrongly formed.
(a) Z
(b) Y
(c) X
(d) W

(vi) If the empirical formula of an organic compound is CH_2O, then its molecular formula can be:
(a) $C_2H_2O_2$
(b) C_2H_4O
(c) C_3H_6O
(d) $C_6H_{12}O_6$

(vii) The catalyst used in Contact process is:
(a) Copper
(b) Iron
(c) Vanadium pentoxide
(d) Manganese dioxide

(viii) HCl gas fumes in moist air due to:
(a) High reactivity
(b) Volatility
(c) Combustibility
(d) High solubility in water

(ix) Ammonia gets catalytically oxidised to give:
(a) $N_2 + H_2O$
(b) $NO_2 + H_2O$
(c) $NO + H_2O$
(d) $N_2 + H_2$

(x) In an activity when 1 ml of ethanol, 1 ml of glacial acetic acid along with a few drops of concentrated sulphuric acid is to be taken in a test tube and heated in a water bath.
P: A compound having pleasant fruity smell is obtained.
Q: This process is called Esterification.

Which of the above statement is correct?
(a) Only P
(b) Only Q
(c) Both P and Q
(d) Neither P nor Q

(xi) In which of the following compounds – OH is the functional group:
(a) Butanone
(b) Butanol
(c) Butanoic acid
(d) Butanal

(xii) The white precipitate that is soluble in excess NH_4OH is:
(a) Lead chloride
(b) Zinc sulphate
(c) Silver chloride
(d) All of these

(xiii) A compound which liberates reddish brown gas around the anode during electrolysis in its molten state is:
(a) Lead (II) nitrate
(b) Lead (II) sulphate
(c) Lead (II) oxalate
(d) Lead (II) bromide

(xiv) On mixing aqueous solutions of sodium sulphate and barium chloride.
What type of observation will be seen?
P: Yellow precipitate of barium sulphate is formed which is insoluble in water.
Q: White precipitate of sodium chloride is formed which is soluble in water.
R: White precipitate of barium sulphate is formed which is insoluble in water

(a) Only P
(b) Only Q
(c) Only R
(d) Both Q and R

(xv) Which of the following is not a polar molecule?

(a) CCl_4

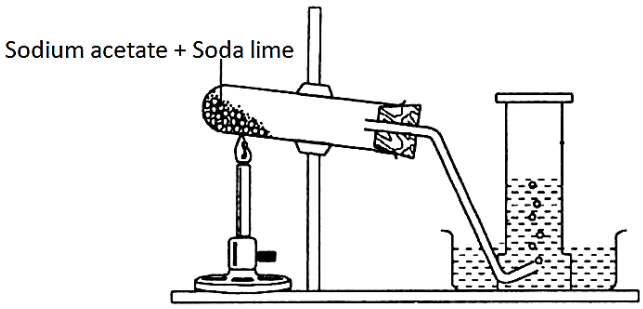
(b) HCl

(c) H_2O

(d) NH_3

Question 2

(i) The setup shown below is that of the laboratory preparation of a gas. [5]



(a) Name the gas being collected in the jar.

(b) Write a balanced chemical equation for the above preparation.

(c) How is the gas being collected in the gas jar?

(d) Name the type of reaction taking place in this.

(e) Why is soda lime used in preference to NaOH in this reaction?

(ii) Match the following Column A with Column B: [5]

Column A	Column B
(a) Acetic acid	1. Preparation of a gas used in ripening of fruits
(b) Calcium carbide	2. Zinc oxide
(c) Covalent compound	3. Haematite
(d) Amphoteric	4. Vinegar
(e) Iron	5. Low melting point

(iii) Complete the following by choosing the correct answers from the bracket: [5]

(a) As we descend the electrochemical series containing cations, the tendency of the cations to get _____ (oxidised / reduced) at the cathode increases.

(b) If an element has seven electrons in its outermost shell, then it is likely to have the _____ (largest / smallest) atomic size among all the elements in the same period.

(c) Sodium hydroxide solution when added to a solution of _____ ($FeCl_3$ / $FeSO_4$) gives dirty green precipitate.

(d) Quicklime is not used to dry HCl gas because it is _____ (alkaline / acidic) in nature.

(e) The compound formed when ethanol reacts with sodium is _____ (Sodium ethanoate / Sodium ethoxide)

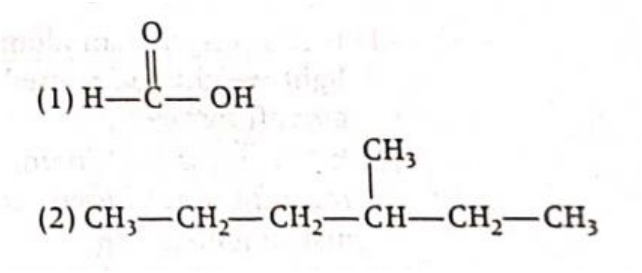
(iv) Identify the following: [5]

(a) The gas produced when excess ammonia reacts with chlorine.
(b) Hydrocarbons by the name olefins.
(c) The method of concentration applied for sulphide ores.
(d) An alloy of lead used for soldering purposes.
(e) A solution which gives nitrogen dioxide with copper.

(v) (a) Draw the structural diagram for the following compounds: [5]

1. Pentan-2-ol
2. But-2-yne
3. 2-chlorobutane

(b) Give the IUPAC name of the following organic compounds:



SECTION B

*(Attempt **any four** questions)*

Question 3

(i) Calculate the empirical and molecular formula of an organic compound from the data given below: [3]
C = 75.92%, H = 6.32%, N = 17.76%
Vapour density = 39.5 (C = 12, H = 1, N = 14)

(ii) Identify the particles present in the following solutions and name them: [3]

(a) Liquid carbon tetrachloride
(b) Potassium hydroxide solution
(c) Sodium carbonate

(iii) Give balanced chemical equations for the following: [4]

(a) Preparation of ethanol by hydrolysis of alkyl halide.
(b) Laboratory preparation of nitric acid from Chile salt petre.
(c) Conversion of sodium aluminate to aluminium hydroxide.
(d) The oxidising action of conc. Sulphuric acid on carbon.

Question 4

(i) Draw electron dot structure for the following: [2]

(a) Cl_2 (b) CaO

(ii) Distinguish between the following as directed: [2]
(a) Calcium carbonate and Magnesium sulphite (using dil. HCl)
(b) Dil. Sulphuric acid and Dil. Hydrochloric acid (using $BaCl_2$ solution)

(iii) Arrange the following as per the instruction given in the brackets: [3]
(a) K, Rb, Li, Na (increasing order of ionisation energy)
(b) B, C, Be, F, O, Li (increasing order of non-metallic character)
(c) Al, Si, Mg, Na (increasing order of atomic size)

(iv) State one relevant observation of the following reactions: [3]
(a) Copper sulphate is electrolysed using copper electrodes.
(b) Zinc reacts with hot and concentrated NaOH.
(c) Ammonium hydroxide solution is added slowly to the product obtained on treating heated iron with chlorine.

Question 5

(i) Explain why: [2]
(a) Ammonia cannot be collected over water.
(b) Direct addition of dil. Sulphuric acid to Lead carbonate to prepare Lead sulphate is an impractical method.

(ii) Give the ionic reactions that take place at cathode and anode in electrolytic reduction of fused alumina. [2]

(iii) Draw the position isomers of Butyne. [2]

(iv) Zinc blende (ZnS) is roasted in air. Calculate: [2]
(a) The number of moles of sulphur dioxide liberated by 776 g of ZnS.
(b) The weight of ZnS required to produce 22.4 litres of SO_2 at s.t.p.
(Zn=65, S=32, O=16)

(v) Identify the alloy in each case from the given composition: [2]
(a) Iron, Nickel, Chromium, Carbon.
(b) Aluminium, Magnesium, Manganese, Copper.

Question 6

(i) If 80 ml of ethane is burnt in 300 ml of oxygen, find the composition of the resultant gaseous mixture when measured at room temperature. [2]

(ii) Convert the following reactions into a balanced chemical equation: [2]
(a) Burning of ammonia in oxygen.
(b) Sodium hydroxide to Sodium sulphate using dil. Sulphuric acid.

(iii) The following questions are pertaining to the laboratory preparation of ammonia gas from Magnesium nitride: [3]
(a) Write a balanced chemical equation for its preparation.

(b) Why is this method seldom used?
(c) How do you identify the gas formed?

(iv) Answer the following questions with reference to electro refining of copper: [3]
(a) What is the anode made of?
(b) What do you observe at the cathode?
(c) Write the reaction taking place at cathode.

Question 7

(i) Give balanced chemical equations for the following reactions: [3]
(a) Preparation of ethene from ethanol.
(b) Conversion of methane to carbon tetrachloride.
(c) Catalytic hydrogenation of ethylene.

(ii) An element has 2 electrons in its N shell. [3]
(a) What is its atomic number?
(b) State its position in the periodic table.
(c) What is the valency of this element?

(iii) Write the name and formula of third member of the following homologous series: [2]
(a) Alkyne
(b) Alcohol

(iv) Define the following terms: [2]
(a) Atomic radius
(b) Isomers

Question 8

(i) Answer the following: [2]
(a) Name the process used for the purification of bauxite.
(b) Write the equation for the action of heat on Aluminium hydroxide.

(ii) Calculate the percentage of phosphorus in the fertilizer Super phosphate $Ca(H_2PO_4)_2$ correct to one decimal point. (H=1, P=31, O=16, Ca=40) [2]

(iii) Study the following observations and name the anions present in each of the reactions: [3]
(a) When a crystalline solid '**P**' is warmed with concentrated Sulphuric acid and copper turnings, a reddish brown gas is released.
(b) When few drops of dilute Sulphuric acid is added to salt '**R**' and heated, a colourless gas is released which turns moist lead acetate paper silvery black.
(c) When few drops of barium nitrate solution is added to the salt solution '**Q**', a white precipitate is formed which is soluble in HCl.

(iv) Making use only of substances given: [3]
Dil. Sulphuric acid, Sodium carbonate, Zinc, sodium sulphite, Lead, Zinc sulphate.
Give equation for the reactions by which you could obtain:

(a) Hydrogen
(b) Sulphur dioxide
(c) Zinc carbonate

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