

GREENLAWNS HIGH SCHOOL
SEMESTER I EXAMINATION
CHEMISTRY
X – 24/09/24

Maximum Marks: 80

Time allowed: Two hours

Answers to this Paper must be written on the paper provided separately.

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)

Question 1

Choose the correct answers to the questions from the given options.
(Do not copy the question, Write the correct answer only.)

[15]

(i) The groups which shows univalency in periodic table are

- | | |
|------------------------|------------------------|
| (a) groups I and II | (b) groups I and VII A |
| (c) groups I and VII B | (d) groups I and VI A |

(ii) Periodic properties which affect chemical bond formation of ionic compound are

- | | |
|--------------------------|------------------------|
| (i) ionization potential | (ii) electronaffinity |
| (iii) electroconductiviy | (iv) electronegativity |
| (a) all of the above | (b) i and iii only |
| (c) i, ii and iv | (d) i, ii and iii |

(iii) Assertion (A): When $\text{Ca}(\text{NO}_3)_2$ is reacted with NH_4OH no ppt is formed.

Reason (R): Concentration of OH^- ion is low and cannot precipitate $\text{Ca}(\text{OH})_2$

- (a) Both A and R are true and R is a correct explanation for A
- (b) Both A and R are true and R is not a correct explanation for A
- (c) A is true but R is false
- (d) A is false but R is true

(iv) An indicator of the average kinetic energy possessed by a molecule is

- (a) volume
- (b) pressure
- (c) vigorous reactivity
- (d) temperature

(v) Metals generally extracted by electrolysis are

- (a) K and Mg
- (b) K and Zn
- (c) Cu and Hg
- (d) Mg and Ag

(vi) Catenation is maximum in carbon because

- (a) C-C bond length is maximum
- (b) C-C bond length is minimum
- (c) C-C bond energy is maximum
- (d) C-C bond energy is minimum

(vii) $\text{P} \rightarrow \text{C}_{10}\text{H}_{22}$ $\text{Q} \rightarrow \text{C}_{12}\text{H}_{24}$

- (a) P is saturated and Q is unsaturated
- (b) P is unsaturated and Q is saturated
- (c) both P and Q are saturated
- (d) both P and Q are unsaturated

- (viii) Which anode is to be used to prevent fading of aq. CuSO_4 soln. during its electrolysis.
- (a) platinum (b) graphite
(c) copper (d) iron
- (ix) 0.5 mole of O_2 gas occupies _____ space at s.t.p.
- (a) 22400 cc (b) 11200 cc
(c) 11200 dm^3 (d) 22400 L
- (x) The pair of cations which are both green in colour.
- (a) Cd and Ca ions (b) Ni and Mg ions
(c) Ni and Cr ions (d) Cr and Co ions
- (xi) For formation of covalent bond electronegativity difference between combining atoms should be
- (a) maximum (b) high
(c) low (d) negligible
- (xii) Electron affinity of Lithium, sodium and potassium is represented correctly by
- (a) $\text{Li} > \text{Na} < \text{K}$
(b) $\text{Li} < \text{Na} > \text{K}$
(c) $\text{Li} > \text{Na} > \text{K}$
(d) $\text{Li} < \text{Na} < \text{K}$
- (xiii) Unit of ionisation potential is
- (a) Volt (b) ampere
(c) millivolt (d) electron volt

- (xiv) When ethyne is reacted with hydrochloric acid products formed are
- (a) chloroethene and 1,1-dichloroethane
 - (b) chloroethane and 1,1-dichloroethene
 - (c) chloroethyne and 1,1-dichloroethyne
 - (d) chloroethyne and 1,2-dichloroethyne
- (xv) Organic compound having fruity smell
- (a) ethanol
 - (b) ethanal
 - (c) ethyl acetate
 - (d) ethanoic acid

Question 2

- (i) Identify the following : [5]
- (a) The distance between the centre of the nucleus of an atom and its outermost shell.
 - (b) CCl_4 and CH_4 are which type of covalent compound.
 - (c) The standard pressure value when expressed in cm.
 - (d) Electrolyte used in electroplating with silver.
 - (e) Alcohol which can cause blindness or death even in small doses.
- (ii) Complete the following by choosing the correct answers from the bracket: [5]
- (a) _____ has the highest ionisation potential. (Helium / Neon)
 - (b) _____ is an orange coloured anion. (CrO_4^{2-} / $\text{Cr}_2\text{O}_7^{2-}$)
 - (c) Type of current used for electrolysis is _____. (D.C. / A.C.)

- (d) Hydrolysis of _____ results in the formation of acetic acid.
(ethanol / ethyl acetate).
- (e) Polyethylene is formed by _____ of ethene. (condensation / polymerisation)

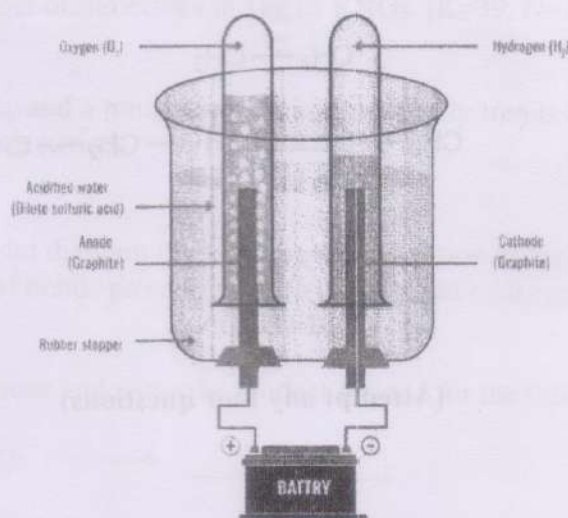
(iii) Match the following

[5]

- | | |
|-----------------------|-----------------------|
| (a) Lanthanide series | 1. strong electrolyte |
| (b) Actinide series | 2. soluble salt |
| (c) sodium zincate | 3. insoluble ppt |
| (d) zinc hydroxide | 4. rare earth |
| (e) sodium hydroxide | 5. radioactive |

(iv) Electrolysis of water is carried out on water acidified with dilute sulphuric acid. Answer the question based on the catalysis of acidulated water.

[5]



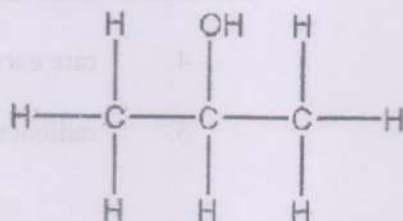
- (a) Why pure water is not used for electrolysis?
- (b) What is done to ensure saturation of the gases in the electrolyte?
- (c) Why dil. sulphuric acid is preferred over dil. nitric acid for acidification?
- (d) Why OH^- ion is discharged in preference to SO_4^{2-} ions?
- (e) Write the anode reaction for the electrolysis of water.

(v) (a) Draw the branched structural formula for each of the following : [5]

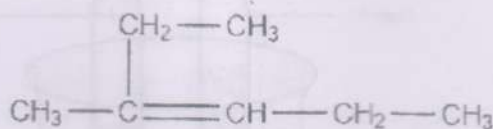
- 1,1,2,2 tetrabromoethane
- ethanal
- 2-ethyl propanoic acid

(b) Write the IUPAC name for the following compounds :

1.



2.



SECTION B

(Attempt any four questions)

Question 3

- Draw atomic structural diagram of nitrogen molecule. [2]
- Why non-polar covalent compounds are non-conductors while polar covalent compounds are conductor of electricity in molten or solution state? [2]
- Discuss giving reasons the trends in electronegativity down the group. [3]
- The V.D. of CO_2 is 22. What will be the volume of 132g of CO_2 in cc at S.T.P? [3]

Question 4

- (i) Sodium hydroxide is added first in small quantity then in excess to aqueous salt solution of $\text{Pb}(\text{NO}_3)_2$. Write the observations for both the situations. [2]
- (ii) Calculate the volume of oxygen required for complete combustion of 1 mole of methane. All volumes are measured at s.t.p. [2]
- (iii) Define electrorefining. Name the anode and cathode used in electrorefining of impure copper metal and write the anode and cathode reaction for the same. [3]
- (iv) Write balanced chemical equation along with necessary conditions and name of the reactants for the preparation of ethyl ethanoate. [3]

Question 5

- (i) Calculate the number of molecules in 1kg of KNO_3 . [K=39, N=14, O=16] [2]
- (ii) Write one similarity and a transition seen in the property trends of elements from left to right in a period. [2]
- (iii) Draw the electron dot diagram representing the formation of the hydronium ion and state the type of bonds present between oxygen and hydrogen atoms. [3]
- (iv) Complete the reactions and name the product formed for the following : [3]
- (a) $\text{C}_2\text{H}_2 + \text{O}_3 \longrightarrow$ _____
- (b) $\text{C}_2\text{H}_4 + \text{H}_2\text{O} + [\text{O}] \longrightarrow$ _____

Question 6

- (i) What are bridge elements? Give 2 examples of pair of bridge element and typical element which have similar properties. [2]
- (ii) Give reason: Atomic radii of elements in group 18 is more than that of group 17 and electron affinity is zero. [2]

- (iii) Compare the speed of reactions of ionic and covalent compounds and justify it giving reasons. [3]
- (iv) Write the observation and balanced equations for the following reactions ; [3]
- (a) Ammonium hydroxide is added drop wise to a solution of FeSO_4 .
- (b) Ammonium hydroxide is added in excess to a solution of CuSO_4 .

Question 7

- (i) Draw atomic structural diagram of ammonia molecule [2]
- (ii) Complete the following reactions giving products and conditions : [2]
- (a) $2\text{CH}_3\text{I} + 2\text{Na} \xrightarrow{?} \text{_____} + 2\text{NaI}$
- (b) $\text{C}_2\text{H}_4 + \text{I}_2 \xrightarrow{?} \text{_____}$
- (iii) What is electroplating? Give 2 reasons for electroplating with an example for each. [3]
- (iv) Calculate the number of moles of Al^{3+} ions and hydroxide OH^- ions which will be obtained from 234g of $\text{Al}(\text{OH})_3$. [$\text{Al} = 27, \text{O} = 16, \text{H} = 1$] [3]

Question 8

- (i) List 2 factors affecting selective discharge of ions during electrolysis. [2]
- (ii) The blue colour of aq. Copper [II] sulphate solution remains unchanged during electrolysis using copper electrode. [2]
- (iii) With respect to n/p ratio compare the stability of $^{23}_{11}\text{Na}$ and $^{236}_{92}\text{U}$ elements. [3]
- (iv) What vol. of O_2 at s.t.p. is required to affect the combustion of 11L. of C_2H_4 at s.t.p. Vol. of O_2 supplied is 50 L. Calculate the vol. of the gaseous mixture in the product? [3]