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ལུ་ཉིག་ཐང་འབྲིང་རིམ་སློབ་གྲྭ་གོང་མ།



**MOTITHANG HIGHER SECONDARY SCHOOL
THIMPHU THROMDE**

“Every child is **inspired** to learn and **empowered** with **wisdom** to excel in life”

TRIAL EXAMINATION-2019

Subject : Chemistry

Total Marks: 100

Class : X

Writing time: 2 hours

Name _____ Class/Sec _____ Roll No _____

Invigilator's initial

READ THE FOLLOWING DIRECTIONS CAREFULLY:

1. Do not write during the first fifteen minutes. This time is to be spent on reading the questions. After having read the questions, you will be given two hours to answer all questions.
2. In this paper, there are two sections: A and B. Section A is compulsory. You are expected to attempt any five questions from section B.
3. The intended marks for questions or parts of questions are given in brackets [].
4. Read the directions to each question carefully and write all your answers in the answer in the space provided.

For chief marker's and markers' use only									
Question Number								Total	Chief marker's signature
Marks Awarded									
Marker's initial									

SECTION: A [50 marks]

COMPULSORY:

Attempt **ALL** questions

Question 1.

a. Direction: For each question, there are four alternatives A, B, C and D. Choose the correct alternative and circle it. Do not circle more than ONE alternative. If there are more than one circled, NO score will be awarded. [25]

- i. Which of the following halogens is radioactive in nature?
 - A. Bromine
 - B. astatine
 - C. Chlorine
 - D. Fluorine

- ii. An experiment was carried out to find the action of sodium hydroxide with a salt solution. After the experiment, a reddish brown precipitate was observed due to the formation of
 - A. ferrous hydroxide.
 - B. ferrous chloride.
 - C. ferric hydroxide.
 - D. ferric chloride.

- iii. Rods or plates used to conduct current in electrolysis are called
 - A. anodes.
 - B. cathodes.
 - C. electrodes.
 - D. electrolytes.

- iv. The elements of group VII A in the Periodic Table are called
 - A. alkaline earth metals.
 - B. alkali metals.
 - C. inert gases.
 - D. halogens.

- v. How many sub-orbital(s) is/ are present in L-shell?
 - A. 1
 - B. 2
 - C. 3
 - D. 4

- vi. 1.5 moles of oxygen at STP occupies a volume of
- A. 11.2L.
 - B. 22.4L.
 - C. 33.6L.
 - D. 44.8L.
- vii. Denatured alcohol is prepared by adding the following substances **EXCEPT**
- A. pyridine.
 - B. methanol.
 - C. copper nitrate.
 - D. copper sulphate
- viii. Which direction will the equilibrium shift in endothermic reaction, if the temperature is decreased?
- A. Equilibrium will shift to left.
 - B. Equilibrium will shift to right.
 - C. Equilibrium will remain same.
 - D. Equilibrium will first shift to left and then to right.
- ix. The factor which does NOT affect the equilibrium of the solution is
- A. concentration.
 - B. temperature.
 - C. pressure.
 - D. catalyst.
- x. Ions get discharged according to their position in the electrochemical series during electrolysis. Which of the following will be discharged the least?
- A. Ca^{2+}
 - B. Al^{3+}
 - C. Zn^{2+}
 - D. Ag^+
- xi. Lower alcohols like methanol burn with a blue flame to form carbon dioxide and water in the presence of atmospheric oxygen. Such a type of reaction is called
- A. oxidation.
 - B. combustion.
 - C. dehydration.
 - D. esterification.

- xii. The periodic property of halogens which increases from fluorine to iodine is
- A. atomic size.
 - B. electron affinity.
 - C. electronegativity.
 - D. ionisation energy.
- xiii. Police use breath analyzer to detect the level of alcohol in drivers. Which property of alcohol is used in breath analyzers?
- A. reducing property
 - B. oxidising property
 - C. denaturing property
 - D. dehydrating property
- xiv. The relative molecular mass of glucose ($C_6H_{12}O_6$) is
- A. 120.
 - B. 160.
 - C. 180.
 - D. 200.
- xv. In the reaction the reducing agent is $ZnO + C \rightarrow Zn + CO$,
- A. ZnO.
 - B. CO_2 .
 - C. Zn.
 - D. C.
- xvi. Which one of the following weighs the least?
- A. 1 mole of NH_3
 - B. 1mole of H_2O
 - C. 1 mole of CO_2
 - D. 1 mole of SO_2
- xvii. At constant temperature, the product of pressure and volume of a given amount of gas is constant. This is according to
- A. Charle's Law
 - B. Gay-Lussac's Law
 - C. Boyle's Law
 - D. Avogadro's Law
- xviii. The principal ore of Iron is
- A. zinc blende.
 - B. haematite.
 - C. calamine.
 - D. bauxite.

- xix. The transition element used in making filament of the electric bulb is
- A. iron
 - B. titanium
 - C. tungsten
 - D. zinc
- xx. The correct electronic configuration of chloride ion is
- A. 2, 7.
 - B. 2, 8.
 - C. 2, 8, 7.
 - D. 2, 8, 8.
- xxi. The number of molecules present in 35.5 g of chlorine gas is
- A. 3.011×10^{23}
 - B. 6.023×10^{23}
 - C. 9.033×10^{23}
 - D. 1.204×10^{23}
- xxii. Which of the following species will be deposited at the cathode on electrolysis of aqueous solution of potassium bromide?
- A. K
 - B. H_2
 - C. Br_2
 - D. O_2
- xxiii. The coordination number of the complex ion, $[Cu (NH_3)_4(H_2O)_2]^{+2}$ is
- A. 2
 - B. 4
 - C. 6
 - D. 8
- xxiv. The products obtained from fermentation of glucose are
- A. cellulose and water
 - B. carbondioxide and water
 - C. ethanol and oxygen
 - D. ethanol and carbondioxide
- xxv. The ore which is best concentrated by gravity separation method is
- A. magnetite
 - B. alumina
 - C. galena
 - D. cassiterite

b. Match each item under Column A with the most appropriate item in Column B. Rewrite the correct pairs by writing the alphabet against the number in the space provided. [5]

Column A	Column B
i. Reaction of carboxylic acid and alcohol in presence of conc. H_2SO_4	A. Internal energy
ii. Ability of an atom to accept electron readily	B. Shielding Effect
iii. Process of heating concentrated ore in a limited supply of air	C. Esterification
iv. Energy contained in a chemical bond that can be converted to heat	D. Roasting
v. Reduction in the nuclear charge on the electron cloud	E. Enthalpy
	F. Ionization Potential
	G. Electron Affinity
	H. Calcination

i.
ii.
iii.
iv.
v.

c. Fill in the blanks by writing suitable word(s). [5]

- i. Halogen used as bleaching agent is
- ii. At constant temperature when the volume of gas decreases, pressure
- iii. Substances that can act as an acid as well as base is called.....
- iv. An alloy that contains 20-40% Zn and 60-80% Cu is
- v. The poisonous substance added to ethanol to make it unfit for consumption is called.....

d. Correct the following statements by changing only the underlined word(s). [5]

- i. The conversion of maltose to glucose is catalysed by an enzyme zymase
- ii. The liquid metal used in thermometer is lead
- iii. Reagent used for dissolving noble metal is sulphuric acid
- iv. Aluminothermy is the reduction of metaloxides using carbon
- v. Boyle's law states that equal volume of all gases under similar conditions of temperature and pressure contain equal numbers of molecules.

i.
ii.
Iii
.
iv.
v.

e. Answer the following questions [5]

- i. In a reversible reaction (exothermic), what condition will produce a shift to the right if volume is kept constant?

- ii. If the IUPAC name of $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$ is propan-1-ol, what will be its common name?

iii. Define the term mole

iv. What is the difference between mineral and ore?

v. How does concentration of the ion affect its probability to get discharged at the electrodes?

f. Write down the difference between the following pairs. [5]

i. Nuclear Charge and Effective Nuclear Charge (Definition)

Nuclear Charge	Effective Nuclear Charge

ii. Gangue and Flux

Gangue	Flux

iii. Iodine and Bromine (Uses)

Iodine	Bromine

iv. Ferrous Hydroxide and Zinc hydroxide (Solubility in excess NaOH)

Ferrous hydroxide	Zinc hydroxide

v. Endothermic and Exothermic Reactions (Change in Enthalpy, ΔH)

Endothermic Reaction	Exothermic Reaction

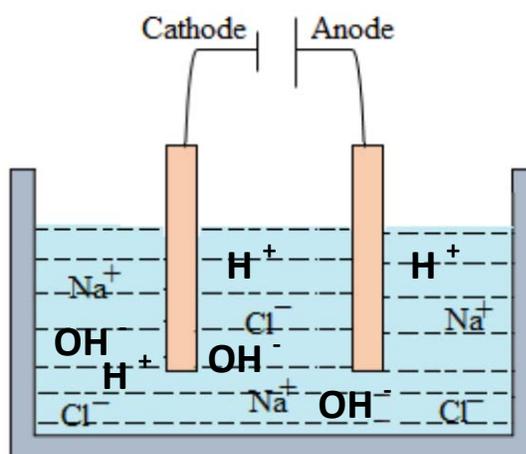
SECTION: B [50 marks]
Attempt ANY FIVE Questions.

Question 2.

- a. A balloon contains 7.2 L of helium gas. When the pressure is reduced to 1620 mm Hg, the balloon expands to occupy a volume of 25.1 L. What was the initial pressure exerted on the balloon? [3]
- b. i. What is meant by concentration of ore? [1]
- ii. List the different methods of concentrating the ore? [2]
- iii. Which method of concentrating the ore is suitable for ores like cassiterite (SnO_2) and haematite (Fe_2O_3)? Give one reason. [2]
- c. The ionic radius of anion is larger than its parent atom. Justify [2]

Question 3.

- a. The diagram given below shows the electrolysis of aqueous sodium chloride. Answer the questions that follow:



- i. Name the ions which will migrate to the cathode and anode respectively. [2]
- ii. Which ions will be discharged at cathode and anode? Why? [2]
- iii. Write the reaction at the cathode and the anode. [2]
- b. The atomic number of Cu is 29. With the help of electronic configuration show that Cu^+ ion will be colourless. [1]

c. Write the IUPAC names of the following Alcohols. [3]

i. $\text{CH}_3\text{CH}_2\text{OH}$:.....

ii. CH_3OH :

iii. $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$:.....

Question 4.

a. A compound with molecular mass of 90 had following percentage composition; C = 26.56%, H = 2.22% and O = 71.19%. (Atomic mass; C = 12, H = 1, O = 16)

i. Determine its empirical formula [2]

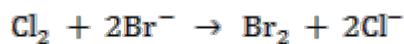
ii. Determine its molecular formula [2]

b. Mention one use of the following; [2]

i. Alnico:.....

ii. Brass:.....

c. Study the given chemical reaction carefully and answer the questions that follow; [2]



i. Identify the species formed by oxidation and reduction

ii. Identify the oxidizing agent and reducing agent

d. The atomic number of Zn is 30. It belongs to d-block element. [2]

i. Write its electronic configuration in s,p,d,f notation.

ii. What is its magnetic behavior and why?

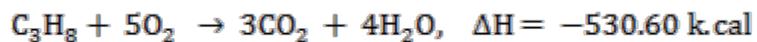
Question 5.

a. Give two reasons why transition elements are good catalyst. [2]

- b. Calculate the volume occupied by 4.2 g of nitrogen at STP given the value of $R = 0.0821 \text{ L atm/mol/K}$ [3]
- c. Write two differences between metallic conductor and electrolytic conductor [2]
- d. With the help of an equation, explain the mechanism of bleaching action of chlorine [3]

Question 6.

- a. Why do transition elements form complex ions easily? [2]
- b. Based on the equation of enthalpy of combustion of propane given below answer the questions that follow.



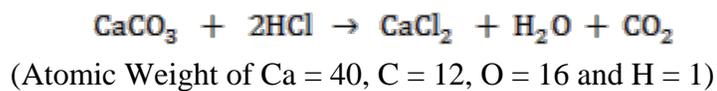
- i. Define enthalpy of combustion [1]
- ii. ΔH is negative. What does it indicate? [1]
- iii. Name the type of reaction. [1]
- c. Define chemical equilibrium. [1]
- d. Name four factors that affect chemical equilibrium of the system [2]
- e. If a bottle of wine is kept opened, first it starts to smell and taste like sour apple. If kept for longer duration it smells and tastes like vinegar. Give reason. [2]

Question 7.

- a. State Le Chatelier's Principle [1]
- b. Complete the following table with regard to periodic properties of halogens [2]

Properties	Across the Period	Down the Group
i. Electronegativity		
ii. Effective Nuclear Charge		

- c. Calcium carbonate react with dilute HCl according to the equation; [3]



- i. Calculate the weight of CaCl_2 obtained from 10 g of CaCO_3
- ii. Calculate the volume of CO_2 obtained at STP
- d. Identify following reactions as oxidation and reduction [2]
- i. $\text{Fe}_2(\text{g}) + 2\text{e}^- \rightarrow 2\text{Fe}^{2-}(\text{aq})$
- ii. $2\text{Br}^-(\text{aq}) \rightarrow \text{Br}_2(\text{aq}) + 2\text{e}^-$
- e. Explain the statement
- “the good thing in using ethanol as the fuel is that the CO_2 emitted during combustion is literally considered as neutral to environment”* [2]