

Kerala Board Class 10 Chemistry 2015 Question Paper with Solutions

1. The impurities which are not removed during ore concentration are called_____ (gangue, flux, slag)

Answer: Gangue

2. Correct the wrong statements if found any from those given below:
- a. When the difference in electronegativity increases, the possibility of covalent bonding increases
 - b. Electronegativity increases while moving from left to right along a period
 - c. Ionic bond is present in HCl molecule
 - d. Partial Ionic bond is also there in a polar molecule

Answer: Slight mistake in option b) Electronegativity increases while moving from left to right in a period also, there is a mistake in option c) It not Ionic bond but Covalent bond is present in HCl molecule.

3. The volume of a definite amount of hydrogen gas taken at 2 atm pressure 25° temperature is 400 mL.

- a. Suggest a method to increase the volume of this gas without a change in pressure
 - b. If the volume of the gas is changed to 200 mL, what will be a new pressure?
- (Hint: Temperature is constant)
- (c) State the gas law used to solve the problem (b)

Answer: a) To suggest a method to increase the volume of this gas without any change in pressure, take the example of the Charles Law. As per the law, when the pressure on a sample of a dry gas is held constant, the Kelvin temperature and the volume will be directly related. Hence, if we increase or decrease the temperature, then the volume will increase or decrease respectively, as they are directly proportional

(b) To calculate the new pressure, apply Boyle's law, where $P_1V_1 = P_2V_2$
That is $2 \times 400 = P_2 \times 200$

Hence, $P_2 = 4$ atm

(C) Meanwhile, to solve the problem (b) Boyle's law was used. This law states that the product of the pressure and volume for a gas is a constant for a fixed amount of gas at a fixed temperature.

4. Sugar taken in a watch glass was found to be charred by adding a substance "X."

- a. What is substance "X"?
- b. What is the reason for the charring of sugar?
- c. Which catalyst is used in the industrial preparation of the substance "X"?

Answer: a) The substance "X" is H_2SO_4 or Sulphuric acid

- b) The reason for charring of sugar is that when the steam is given off, the whole mass gets heated because of an exothermic reaction, thus giving off a black spongy mass of carbon.
- c) Vanadium Pentoxide (V_2O_5) is used as a catalyst in the industrial preparation of the substance "X".

Or

The Chemical equation of the industrial preparation of SO_3 is given.



What is the influence of the following factors in this system at equilibrium?

- Increasing the amount of O_2 .
- SO_3 is removed from the system.
- Decreasing temperature.

Answer: a) When the amount of O_2 is increased, it increases the production of sulphur trioxide (SO_3).

b) If SO_3 is removed from the system, which is at equilibrium then the system will try to increase this removed sulphur trioxide (SO_3). Hence, the equilibrium will shift to the right, confirming forward reaction. That is $SO_2 + O_2$ will react to give SO_3 .

c) When the temperature is decreased, the yield will be maximum.

5. Some equipment and materials are given:

$ZnSO_4$ Solution, $CuSO_4$ Solution

Zn rod, Cu rod, Voltmeter

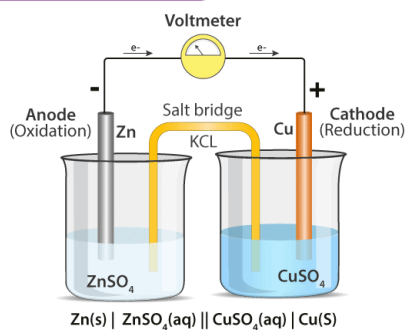
KCl Solution, the filter paper

- Draw the diagram of the electrochemical cell, which can be constructed using this equipment and materials and label the parts.
- Write equations of chemical reactions taking place in the two electrodes of this cell.

(Hint: reactivity $Zn > Cu$)

Answer: a) For the diagram of the [electrochemical cell](#) that is constructed using $ZnSO_4$ Solution, $CuSO_4$ Solution, Zn rod, Cu rod, Voltmeter, KCl Solution and filter paper are given below:

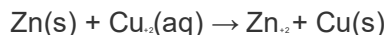
ELECTROCHEMICAL CELL



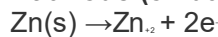
b) Meanwhile, the equations of chemical reactions taking place in the two electrodes of this cell are as follows:

Here, oxidation reaction takes place at the Anode, while reduction occurs at the Cathode of these electrochemical cells.

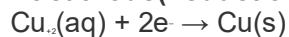
Find here the redox reaction that takes place,



At anode (oxidation half)



At cathode (reduction half)



6. Match the items given in column A and B

A	B
-OH	Amine
-COOH	Alcohol
-NH ₂	Aldehyde
-CHO	Carboxylic Acid

Answer:

A	B
-OH	Alcohol
-COOH	Carboxylic Acid
-NH ₂	Amine

-CHO	Aldehyde
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7. A small amount of MnO_2 is added to H_2O_2 taken in a test tube.

- Suggest an experiment to identify the gas liberated.**
- Write the chemical equation of the reaction taking place.**
- What is the role of MnO_2 in this chemical reaction?**

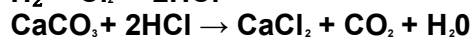
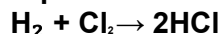
Answer: a) When MnO_2 is added to H_2O_2 taken in a test tube, the decomposition of hydrogen peroxide takes place in the presence of the catalyst manganese dioxide, thus releasing oxygen gas. b)

The chemical reaction of the equation taking place is $2\text{H}_2\text{O}_2 \xrightarrow{\text{MnO}_2} 2\text{H}_2\text{O} + \text{O}_2$.

c) MnO_2 acts as a catalyst and does not undergo any change in itself and also helps to increase the speed of the reaction.

Or

Equations of two chemical reactions are given:



Explain the reason for the following situations using collision theory.

- When the pressure decreases, the speed of formation of HCl decreases.**
- When the particle size of CaCO_3 decreases the speed of chemical reaction increases.**
- All collisions between reactant molecules are not leading to a chemical reaction.**

Answer: a) When the pressure is decreased, the number of collisions between the reactant particles also go down, thus resulting in the slow rate of formation of the HCl .

b) When the particle size of CaCO_3 decreases, the rate of collision of particles is increased, thus causing the increased speed of chemical reactions.

c) All collisions between reactant molecules do not lead to a chemical reaction. Only those molecules with energy greater than the threshold value can undergo effective collision, thus leading to the formation of the products.

8. Equal amount of NaOH solution is added to aqueous solutions of ferric sulphate and ferrous sulphate taken in two different test tubes. Precipitates of two different colours can be seen in these test tubes.

- Which compounds are responsible for different colours?**
- Write the electronic subshell configuration of ferric ion.**
[Hint: atomic number of iron- 26]
- Why do iron form compounds with two different valencies?**

Answer: a) The transition metal compounds cause different colours.

b) $1s^2 2s^2 2p^6 3s^2 3d^5$ is the subshell electronic configuration of ferric ion.

c) The energy difference is very small, between the s-subshell of the outermost shell and the d-subshell of the penultimate shell in d- block elements, such as iron. Hence, during

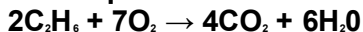
compound formation, electrons may be transferred or shared from both these subshells. Thus, iron can show variable valencies.

9. Find out to which type of chemical reaction, the following changes belong:
(substitution reaction, addition reaction, polymerisation, chemical cracking)

- Methane \rightarrow Chloromethane
- Propene \rightarrow Polypropene
- Hexane \rightarrow Butene + ethane
- Ethane \rightarrow 1, 2- dichloroethane

Answer: a) A substitution reaction takes place here
 b) The reaction in this equation is polymerisation
 c) The reaction that takes place here in this equation is chemical cracking
 d) The reaction used in this equation is the addition reaction

10. Chemical equation for the reaction between ethane gas and oxygen is given below:



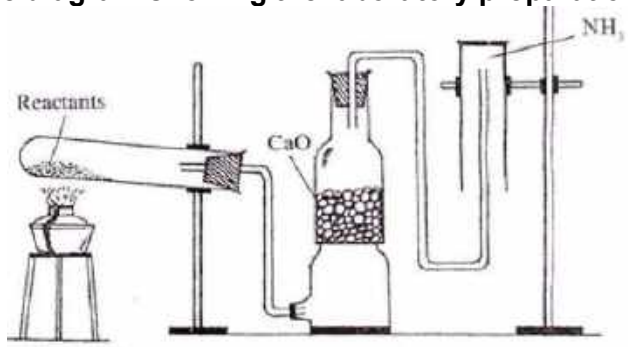
- How many moles of ethane should react to form 20 moles of CO_2 ?
- How many molecules are present in 67.2L ethane at STP?

Answer: a) Given that 2 moles $\text{C}_2\text{H}_6 \equiv 4$ Moles CO_2
 Calculate how many moles of ethane should react to form 20 moles of CO_2
 If you apply the cross multiplication method, Number of moles of $\text{C}_2\text{H}_6 = 10$
 b) Meanwhile, $67.2/22.4 = 3$ moles

Therefore, molecules present in 67.2 L ethane at STP = $3 \times 6.022 \times 10^{23}$

Molecules = 18.066×10^{23} molecules.

11. The diagram showing the laboratory preparation of NH_3 is given below:



- What are the reactants used?
- Why is CaO used?
- What is the reason for not keeping the jar in the upward position?
- Write an experiment to identify the presence of NH_3 in the gas jar.

Answer: a) The reactants used in this experiment are Ammonium chloride and Calcium hydroxide
 b) When Gas is passed through drying the tower containing lumps of CaO , ammonia is produced

- c) The downward displacement of air collects it because it is lighter than air
- d) Fountain experiment is used to identify the presence of NH_3 in the gas jar

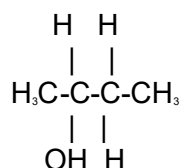
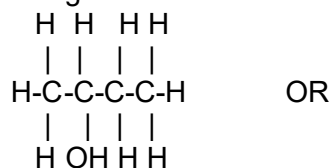
12. Butan-1-ol and methoxy propane are isomers. Their structural formulae are given:



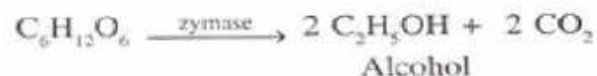
- a. To which type of isomerism this belongs?
- b. Write the structural formula and IUPAC name of the chain isomer of butan-1-ol.

Answer: a) These are functional isomers

b) IUPAC name of chain isomer of butan-1-ol is butan-2-ol and the structural formula of butan-2-ol is as given



13. Equations of preparation of alcohol from sugar are given:



- a. Write the names of compounds A and B
- b. The alcohol obtained here is known as _____
- c. How can this alcohol be converted into the rectified spirit?
- d. How can power alcohol be prepared?

Answer: a) Compound A is glucose, while B is fructose

b) The alcohol obtained here is ethanol or ethyl alcohol

c) Rectified spirit is also called rectified alcohol, which is highly concentrated ethanol purified using the means of repeated distillation in a process called rectification.

d) Power alcohol is a mixture created by the combination of 80% petrol + 20% ethanol and a small quantity of benzene.

14. Is it necessary to ban the use of chemical pesticides to protect your environment? Explain your response to the statement with a suitable example.

Answer: A substantial percentage of pesticides reach a destination other than their target. They enter the air, water, sediments, and even end up in our food. [Pesticides](#) have been linked with human health hazards, from short-term impacts such as headaches and nausea to chronic impacts like cancer, reproductive harm. The use of these also decreases the general biodiversity in the soil. If there are no chemicals in the soil, there is higher soil quality, and this allows for higher water retention, which is necessary for plants to grow. Hence, it is necessary to ban the use of chemical pesticides to protect the environment. They are also the leading cause of the death of aquatic life. Pesticides also contaminate the soil. In the meantime, the most commonly used pesticides are also linked to cancer, birth defects and learning disabilities and so on.