

PREVIOUS QUESTIONS AND ANSWERS

CHEMISTRY (313)

Questions 1 to 5 Carry 1 mark

1. What are the constituents of gunmetal. (Oct 2022)
Answer
Cu, Sn and Zn
2. ----- involves loss of electrons (Ap 2022)
Answer. Oxidation
3. Calculate de broglie wavelength associated with a cricket ball having mass 1 kg and velocity 1 m per second (model question paper 2023)
Answer. De broglie wavelength= 6.626×10^{-34} m
4. What do you mean by mole. (Oct 2022)
Answer the chemical counting unit is called more one more contain 6.023×10^{24} particles
5. ----- is the bond angle of H₂O (April 2024)
Answer 104.5°

Questions 6to 10 carry two marks

6. What do you mean by molar mass. Calculate of mass of 2 mol of CO₂. (Oct 2022)
Answer .
Mass of one mole of a substance is called molar mass it is expressed in gram per mole
Number of moles= mass/ molar mass
Mass = $2 \times 44 = 88$ g
7. Hydrogen combines with oxygen to form two different compounds namely water and hydrogen peroxide. Which law is obeyed by this combination and state the law. (Oct 2021)
Answer: law of multiple proportion
It states that if two elements can combine to form more than one compound the masses of 1 element that combines with a fixed mass of other element are in the ratio of small whole numbers
8. Calculate mass percentage of oxygen in CaCO₃. (Ap 2021)

Answer.

Molecular mass of CaCO_3 . =. 100 g/ mol

Mass of oxygen in 100g CaCO_3 =. 3×16 . = 48g

Ask percentage of oxygen in CaCO_3 . = $48 / 100 \times 100$
= 48%

9. What do you mean by limiting reagent in a chemical reaction. 28 gram of nitrogen is mixed with 12 gram of hydrogen to form ammonia as per the equation (ap2023)



Answer. The reactant which is completely used up first in a reaction is called the limiting reactant.



28g. 6g. 34g

28g. 12g (. Given data)

So N_2 is the limiting reagent. (. Nitrogen is completely used in the reaction)

10. What do you mean by atomic number and mass number (model question paper 2023)

Answer:

The number of electrons or number of protons in an atom is called atomic number

The total number of protons and neutrons in the nucleus is called mass number

Question questions 11 to 14 carry 3 marks

11. A system in thermodynamics refers to that part of the universe in which observations are made (April 2022)
- What do you mean by an isolated system give an example
 - Distinguish between intensive and extensive properties give two examples for each

Answer:

- A system which can neither exchange matter nor energy with the surroundings it is called as isolated system
Eg; thermoflask
- Extensive property - the properties of system which depends upon the quantity of the matter contained in the system
Eg; mass ,volume
Intensive property- the properties of the system whose values are independent of the quantity of substance present in the system
Eg: temperature, pressure

12. A copper rod is placed in silver nitrate solution
- What are the observations
 - Write the displacement reaction
 - Identify the species getting oxidized and its reduced (ap 2022)

Answer

- The colour of the solution changes to Blue silver is deposited on the copper Rod.
 - $\text{Cu} + 2\text{AgNO}_3 \rightarrow \text{Cu}(\text{NO}_3)_2 + 2\text{Ag}$
 - Oxidized species is copper and reduced species is silver
13. The water solutions of ionic compounds NaCl, CH₃COONa and NH₄Cl show different pH. (Model 2023)
- Identify the acidic basic and the neutral solutions among these justify your answer

Answer:

$\text{NaCl} + \text{H}_2\text{O} \rightarrow \text{NaOH} + \text{HCl}$ Hence neutral

$\text{CH}_3\text{COONa} + \text{H}_2\text{O} \rightarrow \text{CH}_3\text{COOH} + \text{NaOH}$. hence basic

$\text{NH}_4\text{Cl} + \text{H}_2\text{O} \rightarrow \text{NH}_4\text{OH} + \text{HCl}$ Hence acidic

In aqueous solution sodium chloride gives NaOH and HCl They are strong acid and strong base so the solution is neutral

In aqueous solution CH₃COONa gives CH₃COOH and NaOH. NaOH is a strong base so the solution is basic

In aqueous solution NH₄Cl gives NH₄OH and HCl .HCl is a strong acid. Hence acidic.

14. Common ion effect is a phenomenon based on Le Chatelier's principle (oct2022)
- Illustrate the common ion effect using an example
 - PH of the concentration of hydrogen ion in a soft drink is 3×10^{-3} M calculate PH
 - Identify the Lewis acid from the following
OH⁻, BCl₃, NH₃, H⁺

Answer

- A. Dissociation of weak electrolyte can be suppressed by adding strong electrolyte having a common ion is called common ion effect. (Eg: dissociation of acetic acid can be suppressed by adding sodium acetate to it)
- B. $\text{pH} = -\log(\text{H}_3\text{O}^+)$
 $= -\log(3 \times 10^{-3})$
 $= 2.53$
- C. BCl_3 and H^+ are Lewis acids

Question 15 carry 5 mark

15. Give main postulates of Bohr atom model. Write the merits and demerits of Bohr atom model. (Oct 2022)

Answer

The main postulates are

- Electrons revolve around the nucleus in certain definite circular paths are called orbits or shells. These shells are numbered as 1, 2 etc. They are designated by K, L etc.
 Maximum number of electrons that can accommodate in a definite orbit is $2n^2$
 So K shell accommodate a maximum number of electrons of 2. L shell accommodate maximum of 8, M shell accommodate a maximum of 18 and N shell accommodate maximum of 32.
- As long as an electron is in a definite orbit it will not lose or gain energy. When the electron jumps from one orbit to another it gains or loses energy.
- Moving electrons have an angular momentum
 $mvr = n \cdot \frac{h}{2\pi}$ (3)

Merits

- Stability explained
- Hydrogen spectrum explained. (1)

Demerits

- Failed to explain the finer lines in the hydrogen spectrum
- This theory was unable to explain the splitting of spectral lines in the presence of a magnetic field
- Could not explain the ability of atoms to form molecules by chemical bonds. (1)

