

TOPIC: SBCC

ASSIGNMENT QUESTIONS:

1. How much copper can be obtained from 100gms of Copper Sulphate?
2. What is the SI unit of Mass? How is it defined?
3. What is meant by significant figures?
4. If 10 volume of dihydrogen Gas reacts with 5 volume of dioxygen gas, how many volume of water vapours would be produced?
5. Calculate the amount of carbon dioxide that could be produced when 1 mol of carbon is burnt in 16 gm of dioxygen?
6. Determine the empirical formula of an oxide of Iron which has 69.9% of Iron and 30.1% of dioxygen by mass?
7. Calculate the mass per cent of different elements present in sodium sulphate?
8. Round up the following upto three significant figures:
a)0.00245 b)2085 c)500.056 d)129003 e)2.089
9. Express the following in scientific notation:
a)0.0048 b)8008 c)6.0015 d)2340098
10. How many significant figures are present in the following:
a)500.012 b)2.0065 c)5000 d)0.00678
11. Explain the law of conservation of mass. Give suitable examples.
12. Calculate the number of atoms in each of the following:
a)52 moles of Ar b)52 u of He c)52 g of He
13. If the speed of light is $3 \times 10^8 \text{ ms}^{-1}$, calculate the distance covered by light in 2.00 ns.
14. Explain Dalton's atomic theory.
15. Explain law of multiple proportions with suitable example?
16. Calcium carbonate reacts with aqueous HCl to give CaCl_2 and CO_2 according to the reaction,
 $\text{CaCO}_3 (\text{s}) + 2 \text{HCl} (\text{aq}) \rightarrow \text{CaCl}_2 (\text{aq}) + \text{CO}_2 (\text{g}) + \text{H}_2\text{O} (\text{l})$
What mass of CaCO_3 is required to react completely with 25 ml of 0.75 M HCl?
17. Nitrogen and hydrogen react to form ammonia according to the reaction
 $\text{N}_2 (\text{g}) + 3\text{H}_2 (\text{g}) \rightarrow 2\text{NH}_3 (\text{g})$
If 1000 g of H_2 react with 2000 g of N_2 ,
a) Will any of the two reactants remain unreacted? If yes, which one and what will be its mass?
b) Calculate the mass of ammonia which will be formed.

TOPIC: STRUCTURE OF ATOM.

1. Calculate the number of electrons which will together weigh one gram?
2. Yellow light emitted from a sodium lamp has a wavelength of 580 nm. Calculate the frequency and wave number of the yellow light?
3. What is the number of photons of light with a wavelength of 4000 pm that provide 1 J of energy?
4. Give the drawbacks of Bohr's model of an atom?
5. Explain Heisenberg uncertainty principle?
6. Explain photoelectric effect with suitable diagram?
7. Calculate the wavelength, frequency and wavenumber of a light wave whose period is $2 \times 10^{-10} \text{ s}$.

8. Calculate the wavelength of an electron moving with a velocity of $2.05 \times 10^7 \text{ ms}^{-1}$?
9. What is the lowest value of n that allows g orbitals to exist?
10. An electron is in one of the $3d$ orbitals. Give the possible values of n , l , and m_l for this electron?
11. What transition in the hydrogen spectrum would have the same wavelength as the Balmer transition $n=4$ to $n=2$ of He^+ spectrum?
12. Indicate the number of unpaired electrons in:
a)P b)Si c)Cr d)Fe e)Kr f)Cu

TOPIC: CLASSIFICATION OF ELEMENTS AND PERIODICITY IN PROPERTIES.

1. What is the basic theme of organization in the periodic table?
2. State difference between Mendeleev's approach for periodic law and modern approach for the periodic law?
3. Elements present in the same group are having similar chemical and physical properties. Why is it so?
4. What do you understand by the term 'Ionic radius' and 'atomic radius'?
5. State the difference between the terms electron affinity and electronegativity?
6. In groups and periods of periodic table where will you find the elements which is having $Z=114$?
7. What are the various factors due to which the ionization enthalpy of the main group elements tends to decrease down the group?
8. i) Define electron gain enthalpy.
ii) Why is the electron gain enthalpy of chlorine more negative than fluorine.
9. (a) First electron affinity are negative but the successive values are positive. Why?
(b) Why does noble gases have the highest radii in their respective periods?
10. a) Name the two elements whose existence and properties were predicted by Mendeleev though they did not exist then.
b) Arrange the following ions in the order of increasing size: Be^{2+} , Cl^- , Na^+ , Mg^{2+}

TOPIC: CHEMICAL BONDING AND MOLECULAR STRUCTURE.

ASSIGNMENT QUESTIONS:

1. What is the total number of sigma and pi bonds in the following molecules?
i) C_2H_2
ii) C_2H_4
iii) C_3H_6
iv) C_2H_6
v) H_2O
vi) CO_2
vii) CCl_4
viii) NH_3
2. How do you express the bond strength in terms of bond order ?
3. Define lattice enthalpy?
4. What type of bond is formed when the atoms have zero difference in electronegativity?
5. Define hydrogen bond ? Is it weaker or stronger than the van der waals forces.
6. Although geometries of NH_3 and H_2O molecules are distorted tetrahedral, bond angle in water is less than that of ammonia. Discuss.
7. Use the molecular orbital theory to explain why the Be_2 molecule doesnot exist.
8. Describe the hybridization in case of PCl_5 . Why are the axial bonds longer as compared to equatorial bonds?

- Discuss the shapes of the following molecules using the VSEPR model. BeCl_2 , BCl_3 ?
- Write the resonance structures of NO_2 , SO_3 and NO_3^- ?
- Which out of NH_3 and NF_3 has higher dipole moment and why?
- Define octet rule. Write its significance and limitations?

TOPIC: STATES OF MATTER.

ASSIGNMENT QUESTIONS:

- Explain the physical significance of van der Waals parameters.
- What do you mean by critical volume and critical pressure?
- Calculate the temperature of 4 mol of a gas occupying 5 dm^3 at 3.32 bar?
- Explain the deviations from ideal gas equation?
- What is viscosity of a liquid?
- Calculate the total number of electrons present in 1.4 g of dinitrogen gas?
- In terms of Charles Law explain why -273 degree Celsius is the lowest possible temperature?
- Explain Kinetic molecular theory of gases?
- Explain London forces with suitable examples?
- Density of a gas is found to be 5.46 g/dm^3 at 27 degree Celsius at 2 bar pressure, What will be its density at STP?
- What do you mean by the term surface tension?
- Explain compressibility factor, Z in terms of gases?

TOPIC: THERMODYNAMICS.

ASSIGNMENT QUESTIONS:

- For an isolated system, $\Delta U=0$, what will be ΔS ?
- The equilibrium constant for a reaction is 10. what will be the value of ΔG ?
- Calculate the entropy change in surroundings when 1 mole of water is formed under standard conditions?
- Give the relationship between c_p and c_v .
- What are extensive and intensive properties? Give their examples.
- State First law of Thermodynamics.
- Explain Gibbs energy and spontaneity of a chemical reaction?
- Explain Hess's law of constant heat summation?
- What do you mean by the term heat capacity?
- In a process, 701 J of heat is absorbed by a system and 394 J of work is done by the system. What is the change in internal energy for the process?
- Calculate the number of kJ of heat necessary to raise the temperature of 60 g of aluminium from 35°C to 55°C . Molar heat capacity of Al is $24 \text{ J mol}^{-1} \text{ K}^{-1}$.
- Enthalpy of combustion of carbon to CO_2 is $-393.5 \text{ kJ mol}^{-1}$. Calculate the heat released upon formation of 35.2 g of CO_2 from carbon and dioxygen gas.

TOPIC: HYDROGEN

ASSIGNMENT QUESTIONS

- Write the names of isotopes of hydrogen. What is the mass ratio of these isotopes?
- Describe the bulk preparation of dihydrogen by electrolytic method. What is the role of an electrolyte in this process?
- What do you understand by the term autoprotolysis of water? What is its significance?
- Compare the structures of water and hydrogen peroxide.
- Discuss the principle and method of softening of hard water by synthetic ion exchange resins.
- How does hydrogen peroxide behave as a bleaching agent?

