

Assignment(polymer)

1. Write short note on polymer.
2. Define polymerization. Differentiate between copolymer and homopolymer.
3. Write down the method of preparation, properties and uses of Teflon and nylon-6,6.
4. Write short note on Bakelite and polythene.
5. Differentiate between addition polymer and condensation polymer with examples of each.
6. Differentiate between thermoplastic and thermosetting plastic.
7. What is meant by fibres? Write down the preparation, properties, and uses of synthetic fibre.
8. What are non-biodegradable polymers? What are the demerits of using them?
9. What do you mean by cross linked polymer? Explain with examples.
10. Differentiate between conducting and non-conducting polymer.
11. What is meant by FRP? write down the uses of FRP.
12. What is silicone? How is it prepared? Write down the properties and uses of silicones.
13. What is rubber? Write down the monomers of natural and synthetic polymer.
14. What is meant by vulcanization? Write its importance.

Assignment(organic reaction mechanism)

1. Define carbocation and carbanion? Differentiate between S_N1 and S_N2 reaction.
2. Explain the mechanism of addition and elimination reaction.
3. Write short note on Markovnikov rule and peroxide effect.
4. Define elimination and substitution reaction. Explain the mechanism of E1 and E2 reaction. Give an account of Saytzeff rule.
5. What is nucleophilic substitution reaction? Briefly explain S_N1 and S_N2 paths of such reaction in haloalkane describing kinetics, reactivity and stereochemistry.
6. Write short note on addition reaction.
7. How does elimination reaction differ from substitution reaction?
8. In the addition of HX to unsaturated hydrocarbon, the hydrogen goes to add the carbon bearing higher number of hydrogens. Why is it so?
9. Write short note on rearrangement reaction.
10. What is S_N reaction? Explain the reaction mechanism of hydrolysis of tertiary alkyl halide by aqueous NaOH.
11. Explain the factors affecting S_N reaction.
12. why is inversion product more than retention product in S_N1 reaction?
13. Write the mechanism for dehydrohalogenation of bromoethane in alcoholic KOH.

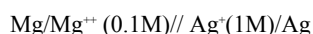
ASSIGNMENT(stereochemistry)

1. What is geometrical isomerism? What are the criteria to exhibit geometrical isomerism? Explain the types of geometrical isomers with examples.
2. Why is cis-isomer less stable than trans-isomer?

- Define optical activity. What are the conditions for a compound to be optically active? Differentiate between optical isomerism and geometrical isomerism.
- What is stereoisomerism? Write about different types of stereoisomerism.
- differentiate between meso compound and racemic mixture.
- What is meant by racemic modification? Explain methods of separation of enantiomers present in racemic mixture.
- What is meant by enantiomers and diastereomers? Explain with examples.
- Explain the optical isomerism shown by tartaric acid and mention the conditions for optical isomerism.
- Give an account of the stereoisomerism of organic compounds having two asymmetric carbon atoms.
- What isomerism is shown by butenedioic acid and why?

Assignment(electrochemistry)

- Define buffer. Derive Henderson equation to calculate the PH the buffer consisting of a weak acid and its salt.
- What is meant by buffer solution? How does a solution containing a mixture of benzoic acid and sodium benzoate maintain its constant pH value even on the addition of small amount of strong acid? Explain. State and explain Ostwald's dilution law.
- What is meant by standard hydrogen electrode? Calculate the emf of the following cell at 25°C.



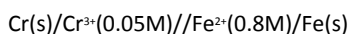
Given,

- $E^\circ \text{Mg}^{++}/\text{Mg} = -2.37\text{V}$
 - $E^\circ \text{Ag}^+/\text{Ag} = +0.8\text{V}$
- What do you mean by standard and non-standard electrode potential? Describe the method to determine standard electrode potential of copper when it is constructed as anode.
 - Differentiate between electrolytic cell and galvanic cell. Give the function of salt bridge. Calculate the emf of the cell.

a. Given,

Also write the cell reaction with showing anode and cathodic reaction.

- Derive Nernst's equation. Also derive the expression for half-cell potential from it.
- The standard reduction potential electrodes are 0.34V and 0.80 V respectively. Can a solution of 1M, AgNO_3 , be stored in copper vessel?
- Define electrode potential. Give the function of salt bridge.
- Define weak electrolyte. How is degree of ionization related with dilution in case of weak electrolyte? Explain.
- How does electrode potential originate? Calculate the electrode potential? Calculate the electrode potential of copper wire dipped in 0.1M copper sulphate solution at 25°C. Given that $E^\circ_{\text{Cu}^{++}/\text{Cu}} = +0.34\text{V}$, $F = 96500\text{C}$, $R = 8.314 \text{ J/mol K}$. Assume that copper sulphate is completely ionized.
- Find the P^{H} of resulting buffer containing 100 ml 1M NH_4OH and 40 ml 1M NH_4Cl in which 20 ml 0.5M HCl is added.
- Calculate the P^{H} of a mixture containing 10 ml of 0.1M ammonium chloride solution and same volume of 0.2 M ammonia solution. (P^{Kb} for ammonia is 4.74)
- The value of E°_{cell} for a reaction:
 $2\text{Al(s)} + 3\text{Cd}^{2+} \longrightarrow 2\text{Al}^{3+}(\text{aq}) + 3\text{Cd(s)}$ is 1.26V calculate E_{cell} at 30°C. Given that $[\text{Al}^{3+}] = 0.5\text{M}$ and $[\text{Cd}^{2+}] = 0.2\text{M}$
- A buffer solution contains 0.25 M NH_3 and 0.4 M NH_4Cl . Calculate H^+ concentration in the solution. K_b of ammonia is 1.8×10^{-5} .
- Write down the cell reaction and emf of the cell at 298K.



Given, $E^\circ_{\text{Fe}^{2+}/\text{Fe}} = -0.44\text{V}$ and $E^\circ_{\text{Cr}^{2+}/\text{Cr}} = -0.71\text{V}$

16. Find the pH of a buffer solution containing 0.2 mole per litre sodium acetate and 0.15 mole acetic acid. K_a for acetic acid is 1.8×10^{-5} .
17. Calculate the emf of Daniel cell at 25°C when concentration of zinc sulphate and copper sulphate are 0.002 M and 0.1 M respectively. The standard cell potential is 1.1V.
18. What do you mean by corrosion? Explain the electrochemical theory of rusting iron? Write down the preventive measures of rusting.

ASSIGNMENT (environmental chemistry)

1. Define pollution. Write down the impact of pollution on human health.
2. What is air pollution? Write down the causes, effect, and control measures of air pollution.
3. What is water pollution? Write down the causes, effect, and control measures of water pollution.
4. What is soil pollution? Write down the causes, effect, and control measures of soil pollution.
5. What is meant by global warming? Write down the causes, effect and control measures of global warming.
6. Write a short note on acid rain and the greenhouse effect.

Assignment (transition element)

1. Explain the following:
 - a. Mn^{+2} is more paramagnetic than Cu^{+2}
 - b. Zn^{+2} compounds are white while Fe^{+2} compounds are colored.
 - c. Transition elements form alloys.
2. Variable oxidation state is the main characteristics of the transition elements, explain with reference to 3d series.
3. Define transition element. 3d transition series show variable oxidation state. Give reason. "completely filled 3d series are unable to form colored compound". Why?
4. Explain the properties of transition elements based on following characteristics:
 - i. Color formation
 - ii. Atomic radii
 - iii. Catalytic action
 - iv. Magnetic properties
 - v. Oxidation state
5. Why are transition elements called so? Which of the 3d series elements is not a transition element and why?
6. Why do transition elements form a significant number of complexes?
7. The presence of unpaired electrons makes the substance paramagnetic in nature. Explain with suitable reason.
8. Are all d block elements called transition elements? Justify your answer with a suitable reason. Point out the industrial application of transition elements.
9. Why are transition elements called d block elements? Write down the electronic configuration of elements of 3d transition series.

10. Transition elements show variable oxidation. Give the reason.
11. What do you mean by Para magnetism and diamagnetism? Explain the cause of origin of Para magnetism in transition elements.

Assignment (Grignard's reagent and explosives)

1. Give the method of preparation and synthetic utilities of Grignard's reagent.
2. Define explosive. What are the main characteristics of good explosives?
3. Write short notes on high explosive and low explosive.
4. Explain different properties of Grignard's reagent in the synthesis of different compounds.
5. Write down the method of preparation, properties and uses of TNT and TNG.
6. Write a short note on organometallic compounds.
7. Write down the reaction of Grignard's reagent with
 - i. water
 - ii. Aldehyde
 - iii. ketone
 - iv. Carbon dioxide
8. What are plastic explosives? Why is detonator required for explosion of TNT?
9. Write down the importance of explosives in the engineering field.
10. Write a short note on dynamite.
11. Differentiate between low and high explosives.
12. Write down the methods of preparation, properties, and uses of gun powder and nitrocellulose.

Assignment (paints)

1. What is paint? Write down the characteristics of good paint.
2. Write short notes on different types of paints.
3. Write down the uses of paint.
4. Differentiate between emulsion paint and enamel.
5. What is meant by drier and vehicles?
6. What are the uses of heat resistant paint.
7. Differentiate between varnish and lacquer.

Coordination chemistry

1. What are coordination compounds? Explain the Werner's theory of coordination compound.
2. Define the term chelate. Write down the application of chelating ligands.
3. What is a ligand? Classify ligand.
4. Write down the postulates of VBT and explain the formation of $[\text{Co}(\text{NH}_3)_6]^{3+}$ and $[\text{CoF}_6]^{3-}$.
5. What is meant by complex ion? Differentiate between outer octahedral and inner octahedral complex.
6. Write down the IUPAC name of the following compounds.

Some examples of complexes with their names:

1. $\text{K}[\text{Ag}(\text{CN})_2]$:
2. $[\text{Pt}(\text{NH}_3)_4(\text{NO}_3)\text{Cl}]\text{SO}_4$:
3. $\text{K}_2[\text{HgCl}_4]$:
4. $[\text{Co}(\text{NH}_3)_3(\text{NO}_2)\text{Cl}_2]$:

5. $\text{Na}[\text{Au}(\text{CN})_2]$:
6. $[\text{Cu}(\text{H}_2\text{O})_2(\text{NH}_3)_4\text{SO}_4]$:
7. $\text{Na}_3[\text{Co}(\text{NO}_2)_6]$:
8. $\text{K}_3[\text{Fe}(\text{CN})_5\text{NO}]$:
9. $\text{K}_3[\text{Fe}(\text{C}_2\text{O}_4)_3]$:
10. $[\text{Pt}(\text{NH}_3)_6]\text{Cl}_4$:
11. $[\text{Pt}(\text{NH}_3)_4][\text{PtCl}_4]$:
12. $\text{K}_2[\text{PtF}_6]$:
13. $\text{Na}[\text{Co}(\text{CO})]$:
14. $[\text{Ag}(\text{CN})_2]^{-4}$:
15. $[\text{NiCl}_4]^{2-}$:
16. $[\text{Fe}(\text{CN})_6]^{4-}$:
17. $[\text{Pt}(\text{NH}_3)_2\text{Cl}_2]^{2+}$
18. $[\text{AuCl}_4]^-$
19. $\text{K}[\text{Ag}(\text{CN})_2]$
20. $[\text{Co}(\text{H}_2\text{O})_6]\text{Cl}_3$

7. Differentiate between complex compound and double salt.
8. How does valence bond theory explain the formation of four coordinated complexes? Illustrate with two suitable complexes.
9. Write down the applications of coordination compounds.
10. How does valence bond theory explain the formation of octahedral, tetrahedral, and square planar complexes? Give one example of each.