

## CHEMISTRY.

## Unit - 01.

## Metallurgy.

Any two:

Part - 1.

$$2 \times 2 = 4$$

1. What are the differences between minerals and ores?
2. Which type of ores can be concentrated by froth floatation method? Give two examples for such ores.
3. Give the limitations of Ellingham diagram.

Part - 2.

$$2 \times 3 = 6$$

1. Describe a method for refining nickel.
2. Explain the following terms with suitable examples:
  - i). Gangue.
  - ii). Slag.

Part - 3.

$$3 \times 5 = 15$$

1. Give the uses of zinc.
2. Explain the electrometallurgy of aluminium.
3. Explain froth floatation method.

## CHEMISTRY.

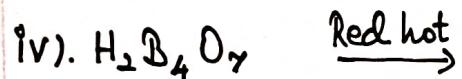
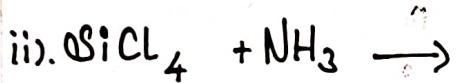
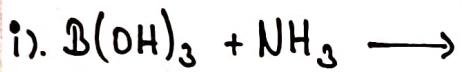
## Unit - 02.

## p-Block Elements - I.

Part - 1.

3 × 2 = 6

1. Give the uses of Borax.
2. Give the structure of CO and CO<sub>2</sub>.
3. Complete the following reactions:

Part - 2.

3 × 3 = 9.

Any three:

1. Write a note on Fischer tropisch synthesis?
2. Describe the structure of diborane.
3. How will you identify borate radical?
4. How will you convert boric acid to boron nitride?

Part - 3.

2 × 5 = 10.

1. Write a note on zeolites.
2. Explain potash alum.

Chemistry.Unit test-3.s.p-Block Elements - II.

Total marks : 25

$$3 \times 2 = 6$$

I. 2 marks:

1. What is inert pair effect?
2. Halogens belongs to p-block. Give reason.
3. Why fluorine is more reactive than other halogens?

II. 3 marks:

$$3 \times 3 = 9$$

1. What are interhalogen compounds? Give examples.
2. Give reason to support that sulphuric acid is a dehydrating agent.
3. Give the uses of argon.

III. 5 marks:

$$2 \times 5 = 10.$$

1. Give the uses of helium.
2. Write the molecular formula and structural formula for the following molecules.
  - a). Nitric acid.
  - b). dinitrogen pentoxide.
  - c). phosphoric acid.
  - d). phosphine.

UNIT-4 TRANSITION AND INNER TRANSITION ELEMENTS.Textual 2 & 3 Questions :

1. What are transition metals? Give four examples.
2. Justify the position of lanthanoids and actinoids in the periodic table?
3. Describe the preparation of potassium dichromate.
4. What is lanthanoid contraction and what are the effects of lanthanoid contraction?
5. What are interstitial compounds.
6. Calculate the number of unpaired electrons in  $Ti^{3+}$ ,  $Mn^{2+}$  and calculate the spin only magnetic moment.
7. Which is more stable?  $Fe^{3+}$  or  $Fe^{2+}$  - explain
8. Compare lanthanoids and actinoids.
9. Explain why  $Cr^{2+}$  is strongly reducing while  $Mn^{3+}$  is strongly oxidizing.
10. Out of  $Lu(OH)_3$  and  $La(OH)_3$  which more basic and why?
11. Which metal in the 3d series exhibits +1 oxidation state most frequently and why?
12. Transition metals show high melting points. Why?

Additional 2 & 3 mark questions.

1. Write two characteristic of the transition elements?
2. Why transition elements show variable oxidation state?
3. Why do transition elements and its compounds act as catalyst?
4. Classify the following elements into d-blocks and f block elements.

5. Complete the following reactions.



6. Explain chromyl chloride test.

7. There is only a marginal difference in decrease in ionisation enthalpy from Aluminium to Thallium

why?

8. Explain the preparation of  $KMnO_4$ .

9.  $[Sc(CH_3COO)_6]^{3+}$  is colourless - Explain.

## UNIT-6 Solid State.

STD : XII.

MARKS : 25

## PART- I

I. Answer the following questions.  $3 \times 2 = 6$ .

1. Define unit cell.

2. Classify the following solids.

a)  $P_4$  b) Brass c) diamond d) NaCl e) Iodine.

3. Aluminium crystallizes in a cubic close packed structure. Its metallic radius is 125 pm. Calculate the edge length of unit cell.

## PART- II

II. Answer any THREE OF the following questions.  $3 \times 3 = 9$ 

1. Differentiate crystalline solids and amorphous solids.

2. outline the classification of the point defects.

3. Write short note on metal excess defect with an example.

4. What is meant by the term "Coordination number"? What is the co-ordination number of atoms in a SC, BCC, FCC structure.

## PART- III

III Answer the following questions.

 $5 \times 2 = 10$ .

1. Write note on .

i) Frenkel effect.  $2 \frac{1}{2}$ ii) Schottky effect.  $2 \frac{1}{2}$ .

2. calculate the percentage efficiency of packing in case of body centered cubic crystal.

ChemistryUnit test - 5.07. Chemical kinetics.

Total marks : 25.

I. 2 marks:

1. Define rate law and rate constant.
2. Write Arrhenius equation and explain the terms involved.
3. Give two examples for zero order reaction.

II. 8 marks:

1. Define half life of a reaction. Show that for a first order reaction half life is independent of initial concentration.
2. What is an elementary reaction? Give the differences between order and molecularity of a reaction.
3. Explain pseudo first order reaction with an example.

III. 5 marks:

1. Derive integrated rate law for a zero order reaction  
 $A \longrightarrow \text{product}$ .
2. Describe the graphical representation of first order reaction.

VOL. 2 B. IONIC EQUILIBRIUM

TIME: 45 MINS.

## UNIT TEST

MARKS: 25

PART-AI. Answer ANY THREE Questions. $3 \times 2 = 6$ 

1. State Ostwald's dilution law.
2. What do you mean by salt hydrolysis?
3. Write the pH values of the following substances.  
a) Vinegar b) Black coffee c) Baking soda d) Soapy  $H_2O$ .
4. Define solubility product.
5. What are Lewis acids and bases? Give two examples for each.

PART-BII. Answer ANY THREE Questions. $3 \times 3 = 9$ 

1. What are buffer solutions? Explain their types with examples.
2. Derive the relationship  $pH$  and  $pOH$ .
3. How solubility product is determined from molar solubility?
4. What are conjugate acid-base pairs? Give example.
5. Write the Limitations of Arrhenius concept.

PART-CIII. Answer ANY TWO Questions. $2 \times 5 = 10$ 

1. Derive Henderson-Hasselbalch equation
2. Derive an expression for the hydrolysis constant and degree of hydrolysis of salt of weak acid and strong base.
3. Explain buffer action of acidic buffer?
4. Derive an expression for Ostwald's dilution law.

## UNIT-11 Hydroxy Compounds and Ethers

### SHORT ANSWER QUESTIONS. (2 & 3 MARKS)

1. Write about the dehydration of glycerol. GMA 19, PTA-3.  
Page No. 121.
2. Write short notes on Riemer Tiemann reaction. GMA-19  
Page No. 130 PTA-3
3. How phenolphthalein is prepared? GMA 2019 · HY-2019  
Page No. 131
4. What is Schotten - Baumann reaction. PTA-2 Page No. 127
5. Write a note on Swern Oxidation PTA-2 Page No. 117.
6. Write the chemical equation for oxidation of ethylene glycol with periodic acid. PTA-2 Page No. 120  
Oxidation of glycol with periodic acid.
7. An organic compound (A) -  $C_6H_8O_3$  used as sweetening agent - which on oxidation with Fenton's reagent gives a mixture of compounds B and C. Identify A, B & C.  
Write possible reactions. PTA-3 Page No. 122.
8. Give four uses of diethyl ether. PTA-4 AUG 2021 Page No. 138
9. How will you prepare 2-methylhexan-2-ol from Grignard reagent. PTA-4 Page No. 108
10. Write the IUPAC name of the following compounds.
  - i)  $C_6H_5 - O - CH_2 - \overset{|}{CH} - CH_3$  PTA-5
  - ii)  $CH_2 = CH - CH_2 - CH_2OH$
  - iii) Neopentyl alcohol
  - iv) Glycerol.

11. Differentiate phenol and ethanol PTA-5 [Page No. 131]
12. How will you prepare the following by using Grignard reagent ? MARCH - 2020 [Page No. 108]
13. Give the Coupling reaction of phenol. MAR. 2020 [Page No. 131]
14. Why is C-O-C bond angle in ether slightly greater than the tetrahedral bonds angle. MAR. 2020 [Page No. 133]
15. What is auto oxidation of ethers. SEP - 2020 (Page No. 131)
16. What is Baeyer's reagent ? How it is useful to convert ethene -1,2 - iodol ? SEP 2020 [Page No. 110]
17. How are the following conversions effected ? Ethylene glycol → acetaldehyde. AUG 2021 [Page No. 119]

#### LONG ANSWER QUESTIONS:

1. Explain LUCAS test of differentiating three types of alcohols AUG-2021 [P. NO. 110]
2. Complete the reaction. PTA-3
- 3)  $\text{CH}_3 - \text{CH} = \underset{\text{CH}_3}{\overset{\text{I}}{\text{C}}} - \text{CH}_3 \xrightarrow[\text{ii)} \text{Zn/H}_2\text{O}]{} \text{?} \quad \text{y) } \text{CH}_3 \text{COCH}_3 \xrightarrow[\text{H}_2\text{O}]{\text{mg-Hg}} \text{?}$
3. A ether  $\text{C}_5\text{H}_{10}\text{O}$  when heated with excess of hot Concentration H<sub>2</sub>O produced two alkyl halides, which on hydrolysis forms compound (B) and (C). oxidation of (B) gives an acid (D) whereas oxidation of (C) gives ketone (E). Identify A, B, C, D and E write the chemical equation. PTA-1
4. An organic compound  $\text{C}_2\text{H}_6\text{O}$  (A) heated with conc.  $\text{H}_2\text{SO}_4$  at 443K to give an unsaturated compound  $\text{C}_2\text{H}_4$  (B), which on treatment with Baeyer's reagent to give compound  $\text{C}_2\text{H}_6\text{O}_2$  (C) which is used as antifreeze in automobile radiator. Compound (C) distilled with conc.  $\text{H}_2\text{SO}_4$ . cyclic compound  $\text{C}_2\text{H}_8\text{O}_2$  D. Compound A is heated con.  $\text{H}_2\text{SO}_4$  at 413K compound  $\text{C}_4\text{H}_10\text{O}$  (E). Identify compound A, B, C, D, E. PTA-6 GIMQ-19.

# VOL. 2 UNIT-12 Carbonyl Compounds and Carboxylic Acids.

## Short Answer Questions:

1. How will you prepare acetylchloride from  $\text{CH}_3\text{COOH}$ .
  2. Mention the test for carboxylic acids.
  3. What is Knoevenagel reaction?
  4. Write a short note on Benedict's solution test.
  5. How are the following conversion effected?
    - a) Hex-3-yne  $\rightarrow$  hexan-3-one.
    - b) Benzaldehyde  $\rightarrow$  2-hydroxy phenyl acetic acid.
  6. Write a note Etard reaction.
  7. Convert hex-4-ennitrile into hex-4-enal.
  8. How are the following conversions effected?
    - X) Benzene  $\rightarrow$  acetophenone
    - Y) Benzaldehyde  $\rightarrow$  Hydrobenzamide.
  9. Name the ester which has the following flavour?
    1. Banana
    2. Orange
    3. Pineapple
    - 4) Apricot.
  10. Explain the reducing nature of formic acid.
  11. Write a note on Rosenmund reduction. [Page NO 151]
  12. What is transesterification.
  13. Mention the uses of formaldehyde.
  14. What is Benzoin condensation?
  15. How will you prepare.
    - i) Acetic anhydride from acetic acid.
    - ii) Benzoic acid from toluene.
    - iii) Malachite green from benzaldehyde?
    - iv) Cinnamic acid from benzaldehyde.
- LONG ANSWER QUESTIONS :**
1. Explain the mechanism of aldol condensation.
  2. Explain the mechanism of Cannizaro reaction.
  3. What happens when ethanoic acid reacts with ethanol in the presence of  $\text{Con-H}_2\text{SO}_4$ ? Give its complete mechanism.

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P.G. ASST IN CHEMISTRY