CHEMISTRY.

Unit - 01.

Metallurgy.

Part - 1.

Any two: 2×2=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

2×3=6.

1. Describe a method for refining nickel.
2. Explain the following terms with suitable examples:

   i). Gangue. ii). Slag.

Part - 3.

3×5=15.

1. Give the uses of zinc.
2. Explain the electrometallurgy of aluminium.
3. Explain froth flotation 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_2.
3. Complete the following reactions:

   i). $B(OH)_3 + NH_3 \longrightarrow$

   ii). $SiCl_4 + NH_3 \longrightarrow$

   iii). $B + NaOH \longrightarrow$

   iv). $H_2B_4O_7 \xrightarrow{\text{Red hot}}$

Part - 2.

3 × 3 = 9.

Any three;

1. Write a note on Fisher tropsch 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.

3. p-Block Elements - II.

Total marks : 25.

I. 2 marks: $3 \times 2 = 6$

1. What is inert pair effect ?
2. Chalcogens 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 intersitial 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.

M. POOVARASAN M.SC, B.Ed
PG ASST IN CHEMISTRY

5. Complete the following reactions.

i) $2MnO_2 + 4KOH + O_2 \longrightarrow$

ii) $Cr_2O_7^{2-} + 14H^+ + 6I^- \longrightarrow$

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. $[Sc(H_2O)_6]^{3+}$ is colourless - Explain.

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 UNIT TEST

UNIT-6 Solid State.

STD : XII. MARKS : 25

PART- I

I. Answer the following questions. 3X2=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. 3X3=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. 5X2 = 10.

1. Write note on.
i] Frenkal effect. 2½
ii] Schottky effect. 2½.

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

Chemistry

Unit test-5.

07. Chemical kinetics.

Total marks : 25.

I. **2 marks:**

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

II. **3 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.

 XII - CHEMISTRY

VOL. 2 8. IONIC EQUILIBRIUM

UNIT TEST

TIME. 45 MINS. MARKS : 25

PART-A

I. Answer ANY THREE Questions. 3x2=6

1. State Ostwald's dilution law.
2. What do you mean by salt hydrolysis?
3. Writhe 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 example for each.

PART-B

II. Answer ANY THREE Questions. 3x3=9

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

PART-C

III. ANSWER ANY TWO Questions. 2x5=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.

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UNIT-11 Hydroxy Compounds and Ethers

SHORT ANSWER QUESTIONS. (2 & 3 MARKS)

1. Write about the dehydration of glycerol. GMQ 19, PTA-3. Page NO. 121.

2. Write Shortnotes on Riemer Tiemann reaction. GMQ-19 PTA-3 Page NO. 130

3. How phenolphthalein is prepared? GMQ 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) - $C_3H_8O_3$ 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-methyl hexan-2-ol from grignard reagent. PTA-4 page NO. 108

10. Write the IUPAC name of the following Compounds. PTA-5

i] $C_6H_5-O-CH_2-CH(CH_3)-CH_3$

ii] $CH_2=CH-CH_2-CH_2OH$

iii] Neopentyl alcohol

iv] Glycerol.

M. POOVARASAN. M.Sc., B.Ed.
PGT-ASST IN CHEMISTRY

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 either sightly greater than the tetrahedral bonds angle. MAR. 2020 page NO. 133

15. What is autooxidation of ethers. Sep-2020 (page NO. 137)

16. What is Baeyer's regent? How it is useful to convert ethene -1,2-idol? 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. PTB-3

x) $CH_3-CH=\underset{\underset{CH_3}{|}}{C}-CH_3 \xrightarrow[\text{ii) } Zn/H_2O]{\text{(i) } O_3}$? y) $CH_3COCH_3 \xrightarrow[H_2O]{Mg-Hg}$?

3. A ether (A) $C_5H_{12}O$ when heated with excess of hot concentration HI, produced two alkyl halides, which on hydrolysis forms compound (B) and (C). oxidation of (B) gives an acid (D) where as oxidation of (C) gives ketone (E). Identify A, B, C, D and E write the chemical equation. PTA1

4. An organic compound C_2H_6O (A) heated with conc. H_2SO_4 at 443K to give and unsaturated compound C_2H_4 (B), which on treatment with Baeyer's reagent to give compound $C_2H_6O_2$ (C). which is used antifreeze in automobile radiator. Compound (C) distilled with conc. H_2SO_4, cyclic compound $C_2H_8O_2$ D. compound A is heated con. H_2SO_4 at 413K compound $C_4H_{10}O$ (E). Identify compound A, B. PTA-6 GIMQ-19.

Vol. 2 UNIT-12 Carbonyl Compounds and Carboxylic Acids.

Short Answer Questions :

1. How will you prepare acetychloric from CH_3COOH.
2. Mention the test for carboxylic acids.
3. What is knoevenagal reaction?
4. Write a short note an Benedicts solution test.
5. How are the following conversion effected?
   a) Hex-3-yne → hexan-3-one.
   b) Benzaldehyde → 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 → acetophenone
   Y) Benzaldehyde → 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.

M. POOVARASAN M.Sc B
PGT - ASST IN CHEMISTRY

LONG ANSWER QUESTIONS :

1. Explain the mechanism of aldol condansation.
2. Explain the mechanism of cannizaro reaction.
3. What happen when ethanoic acid react with ethanol in the presence of con-H_2SO_4 Give its complete mechanism