

12 - STD

Duration: 3 hrs.

HALF-YEARLY EXAMINATION - 2024  
CHEMISTRY

Total marks = 70

Note: 1) Answer all the questions.

SECTION - I

2) Choose the most suitable answer from the given four alternatives and write the option code and the corresponding answer.

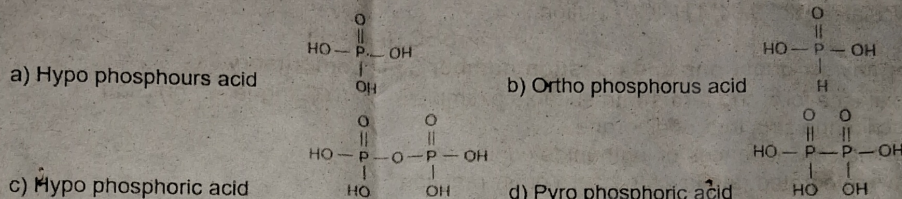
15 X 1 = 15

1. Match items in column - I with the items of column - II and assign the correct code.

	Column - I		Column - II
A	Cyanide process	(i)	Ultrapure Ge
B	Froth floatation process	(ii)	Dressing of ZnS
C	Electrolytic reduction	(iii)	Extraction of Al
D	Zone refining	(iv)	Extraction of Au
		(v)	Purification of Ni

	A	B	C	D
a)	(i)	(ii)	(iii)	(iv)
b)	(iii)	(iv)	(v)	(i)
c)	(iv)	(ii)	(iii)	(i)
d)	(ii)	(iii)	(i)	(v)

2. The compound that is used in nuclear reactors as protective shields and control rods is  
 a) Metal borides    b) Metal oxides    c) Fullerenes    d) None of these
3. Choose the correct pair.



4. Assertion:  $Ce^{4+}$  is used as an oxidising agent in volumetric analysis

Reason :  $Ce^{4+}$  has the tendency of attaining +3 oxidation state.

- a) Both assertion and reason are true and reason is the correct explanation of assertion  
 b) Both assertion and reason are true and reason is not the correct explanation of assertion  
 c) Assertion is true but reason is false    d) Both assertion and reason are false
5. Which of the following is paramagnetic in nature?  
 a)  $[Zn(NH_3)_4]^{2+}$     b)  $[Co(NH_3)_6]^{3+}$     c)  $[Ni(H_2O)_6]^{2+}$     d)  $[Ni(CN)_4]^{2-}$
6. In a solid atom M occupies ccp lattice and  $\frac{1}{3}$  of tetrahedral voids are occupied by atom N. Find the formula of solid formed by M and N.  
 a) MN    b)  $M_3N$     c)  $MN_3$     d)  $M_3N_2$
7. In a reversible reaction, the enthalpy change and the activation energy in the forward direction are respectively  $-x$  KJ  $mol^{-1}$  and  $y$  KJ  $mol^{-1}$ . Therefore, the energy of activation in the backward direction is  
 a)  $(y - x)KJ mol^{-1}$     b)  $(x + y)KJ mol^{-1}$     c)  $(x - y)KJ mol^{-1}$     d)  $(x + y)10^3J mol^{-1}$
8. Which of the following salts does not undergo salt hydrolysis?  
 a) sodium acetate    b) sodium nitrate    c) ammonium chloride    d) ammonium acetate
9. The number of electrons that have a total charge of 965 coulombs is  
 a)  $6.022 \times 10^{21}$     b)  $6.022 \times 10^{26}$     c)  $6.022 \times 10^{22}$     d)  $6.022 \times 10^{25}$
10. The change of W/O emulsion into O/W emulsion is called  
 a) coagulation    b) emulsification    c) Inversion of phase    d) decomposition
11. In the reaction. Ethanol  $\xrightarrow{PCl_5}$  X  $\xrightarrow{alc. KOH}$  Y  $\xrightarrow[298K]{H_2SO_4/H_2O}$  Z. The 'Z' is  
 a) ethane    b) ethoxy ethane    c) ethylbisulphite    d) ethanol
12. Which one of the following is incorrectly matched?  
 a) Tollen's reagent -  $AgNO_3 + NH_4OH$     b) Fehling's solution -  $CuSO_4 +$  Roschelle salt  
 c) Baeyer's reagent - con.HCl + anhyd.  $ZnCl_2$     d) Benedict solution -  $CuSO_4 +$  Sodium citrate + NaOH
13. The product formed by the reaction an aldehyde with a primary amine.  
 a) carboxylic acid    b) aromatic acid    c) Schiff's base    d) ketone
14. Which of the following is not produced by body?  
 a) DNA    b) Enzymes    c) Hormones    d) Vitamins

15. Antiseptics and disinfectants either kill or prevent growth of microorganisms. Identify which of the following is not true.
- dilute solutions of boric acid and hydrogen peroxide are strong antiseptics.
  - Disinfectants harm the living tissues.
  - A 0.2% solution of phenol is an antiseptic while 1% solution acts as a disinfectant.
  - Chlorine and iodine are used as strong disinfectants.

**SECTION - II**

Answer any six questions and question number 24 is compulsory.

6 X 2 = 12

- What are the differences between minerals and ores?
- Why transition elements shows variable oxidation state?
- $[\text{Ti}(\text{H}_2\text{O})_6]^{3+}$  is coloured, while  $[\text{Sc}(\text{H}_2\text{O})_6]^{3+}$  is colourless - Explain.
- Give the differences between order and molecularity of a reaction.
- What are homogeneous and heterogeneous catalysis?
- Aniline does not undergo Friedel Craft's reaction. Account for this.
- Write a short note on peptide bond.
- How is terylene prepared?
- Calculate pH of 0.04M  $\text{HNO}_3$  solution.

**SECTION - III**

Answer any six questions and question number 33 is compulsory.

6 x 3 = 18

- Explain the following terms with suitable examples. (i) Gangue (ii) Slag
- Describe the structure of diborane.
- List the consequences of lanthanide contraction.
- Derive integrated rate law for a zero order reaction.
- Explain Galvanic cell notation with cell diagram.
- Distinguish primary and secondary alcohols by Victor Meyer's test.
- How will you prove glucose contain the following
  - 6 carbon atoms linearly.
  - 5 hydroxy groups.
  - an aldehyde group.
- What are narcotic and non narcotic drugs? Give examples.
- An atom crystallizes in fcc crystal lattice and has a density of  $10 \text{ g cm}^{-3}$  with unit cell edge length of 100 pm. Calculate the number of atoms present in 1 g of crystal.

**SECTION - D**

Answer all the questions.

5 x 5 = 25

- Out of coke and CO which is better reducing agent for the reduction of ZnO. Why? (2)
  - Explain the preparation of potash alum. (3)

(OR)

  - Explain why fluorine always exhibit an oxidation state of - 1? (2)
  - Give the balanced equation for the reaction between chlorine with cold NaOH and hot NaOH. (3)
- What is crystal field stabilization energy (CFSE)? (2)
  - Write the IUPAC name, central metal ion and coordination number for  $[\text{Co}(\text{C}_2\text{O}_4)_3]^{3-}$  (3)

(OR)

  - What are interstitial compounds? (2)
  - Derive Nernst equation. (3)
- Explain the effect of catalyst on reaction rate. (2)
  - Write a note on Frenkel defect. (3)

(OR)

  - Explain common ion effect. (2)
  - Derive Henderson - Hasselbalch equation. (3)
- Write a note on catalytic poison with an example. (2)
  - Write a note on electro osmosis. (3)

(OR)

  - What are hormones? Give example. (2)
  - Write the following reaction. (2)
    - Williamson synthesis
    - Reaction of phenol with zinc dust
- How will you prepare cinnamic acid from benzaldehyde? (2)
  - Explain the mechanism of Cannizzaro reaction. (3)

(OR)

  - How is chloropicrin prepared? (2)
  - Write down the reduction reaction of nitrobenzene in acidic and neutral medium. (3)

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