COMMON HALF YEARLY EXAMINATION - 2024

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Standard XII   Reg.No. ☐☐☐☐☐☐

CHEMISTRY

Time : 3.00 hrs   Part - A   Marks : 70

I. Choose the correct answer: 15 x 1 = 15

1. Considering Ellingham diagram, which of the following metals can be used to reduce Al_2O_3?

   a) Cu   b) Mg   c) Zn   d) Fe

2. In diborane, the number of bonds that accounts for banana bond

   a) two   b) four   c) twelve   d) eight

3. Formula for hyponitrous acid

   a) HNO_2 b) HNO_4 c) HOONO   d) $H_2N_2O_2$

4. The actinoid elements which show the highest oxidation state of +7 are

   a) U, Th, Md   b) U, Fm, Th

   c) Np, Pu, Am   d) Es, NO, Lr

5. In which of the following coordination entities the magnitude of Δ_o will be maximum?

   a) $[CO(C_2O_4)_3]^{3-}$ b) $[CO(CN)_6]^{3-}$

   c) $[CO(NH_3)_6]^{3+}$ d) $[CO(H_2O)_6]^{3+}$

6. The wavelength of X-ray and inter-atomic distance of crystal are same, then the glancing angle of diffraction at which first order reflection occurs is

   a) 60°   b) 45°   c) 0°   d) 30°

7. The rate constant of a reaction is $5.8 \times 10^{-2} s^{-1}$. The order of reaction is

   a) zero order   b) second order

   c) first order   d) third order

8. $H_2PO_4^-$ the conjugate base of

   a) H_3PO_4 b) PO_4^{3-} c) HPO_4^{2-} d) H_3PO_3

9. Among the following cells

   I) Leclanche cell   II) Nickel - Cadmium cell

   III) Lead storage   IV) Mercury cell

   Primary cells are

   a) I and III   b) I and IV   c) II and III   d) III and IV

10. **Assertion :** Coagulation power of Al^{3+} is more than Na^+

    Reason : Greater the valency of the floculating ion added greater is its power to cause precipitation.

    a) Both assertion and reason are false

    b) Assertion is true, but reason is false

    c) If both assertion and reason are true, but reason is not the correct explanation of assertion

    d) If both assertion and reason are true, and reason is the correct explanation of assertion

11. The conversion of an alcohol to alkyl halide by using sulphonyl chloride in the presence of pyridine follows _____ mechanism.

    a) SN^1 b) SN^2 c) SN^i d) E_2

12. The reagent used to distinguish between ethanal and phenyl methanal is

    a) Baeyer's reagent   b) Lucas reagent

    c) Fehling's solution   d) Tollens reagent

13. Nitrobenzene $\xrightarrow{Fe/HCl}$ A $\xrightarrow[273 \text{ K}]{NaNO_2 / HCl}$ B $\xrightarrow[283 \text{ K}]{H_2O}$ C. 'C' is

    a) Benzaldehyde   b) Phenol   c) Aniline   d) Benzyl alcohol

14. The number of hydrogen bonds are formed between Guanine and Cytosine

    a) Three   b) Two   c) One   d) Four

15. Aspirin is

    a) Chlorobenzoic acid   b) 2-acetoxy benzoic acid

    c) Anthranilic acid   d) Benzoyl salicylic acid

Part - B

II. **Answer any 6 questions. (Q.No.24 is compulsory)**   6 x 2 = 12

16. What is Auto-reduction? Give example,

17. Give the uses of silicones.

18. Give the balanced equation for the reaction between chlorine with cold NaOH and hot NaOH.

19. Calculate the pH of 1.5×10^{-3} m solution of $Ba(OH)_2$.

20. State Faraday's first law of electrolysis.

21. Write a note on Dows process.

22. What are Epimers? Give example.

23. How is terylene prepared?

24. Sodium metal crystallizes is BCC structure with the edge length of the unit cell 4.3 $\times 10^{-8}$ cm. Calculate the radius of sodium atom.

Part - C

III. **Answer any 6 questions. (Q.No.33 is compulsory)** 6 x 3 = 18

25. Write one test to differentiate $[Co(NH_3)_5Cl]SO_4$ and $[Co(NH_3)_5 SO_4]Cl$

26. Describe the preparation of potassium dichromate.

27. Distinguish between order and molecularity of a reaction.

28. Imperfection in solids play an important role in various process. Justify.

29. Peptising agent is added to convert precipitate into colloidal solution. Explain with an example.

30. Convert the following :
   a) Methyl acetate to Ethyl acetate   b) Benzaldehyde to Malachite green dye
   c) Ethane Nitrile to Ethanal

31. How is Ethanamine prepared by Gabriel phthalimide synthesis?

32. Write a note on Zwitter ions.

33. Compound (A) $\longrightarrow C_3H_8O_3$ oxidised with Sodium hypobromite to give the mixture of compound (B) and (C). Identify A, B and C. Write the possible reactions. Name the mixture of (B) and (C).

Part - D

IV. **Answer all the questions.** 5 x 5 = 25

34. a) i) Describe the Mond process with principle. (2+1 marks)
       ii) What is the role of FeO in the extraction of copper. (2 marks)
    (OR)
    b) i) What is Inorganic benzene? How is it prepared? (3 marks)
       ii) Why HF cannot be stored in glass bottles? (2 marks)

35. a) i) Out of $Lu(OH)_3$ and $La(OH)_3$ which is more basic? and why? (2 marks)
       ii) Mention the condition for the formation of Alloys? (3 marks)
    (OR)
    b) i) On the basis of VB theory, explain the nature of bonding in $[Co(C_2O_4)_3]^{3-}$. (3 marks)
       ii) Write the formula of Zeise's salt and Magnu's green salt. (2 marks)

36. a) i) Explain Schottky defect. (3 marks)

     ii) What are 'F' centres? (2 marks)

(OR)

b) i) Define Half Life a reaction. Show that for a first order reaction Half Life is independent of initial concentration. (3 marks)

     ii) Write the PH value and nature of the following substances. (2 marks)

        1) Orange juice

        2) Black coffee

        3) Baking soda

        4) Sea water

37. a) i) Derive Nernst equation. (3 marks)

   ii) Mention the medicinal application of colloids. (2 marks)

(OR)

b) i) Explain mechanism of Aldol condensation reaction. (3 marks)

     ii) What happens when anisole undergoes Nitration Reaction? (2 marks)

38. a) i) Write a note on

Thorpe Nitrile condensation reaction and

Benzoin condensation reaction   (3 marks)

     ii) What are Antioxidants? Give example. (2 marks)

(OR)

b) i) Identify (A) and (B)   (2 marks)

$$A \xrightarrow{\ Na(Hg)/C_2H_5OH\ } CH_3 - CH_2 - NH_2$$

$$B \xrightarrow{\ Na(Hg)/C_2H_5OH\ } CH_3 - NH - CH_3$$
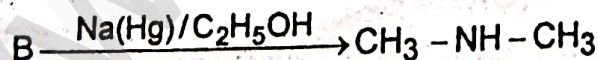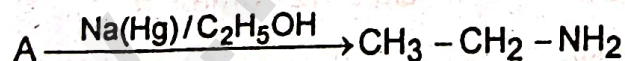
     ii) Distinguish between DNA and RNA. (3 marks)

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