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12TH MODEL PUBLIC EXAMINATION QUESTION PAPER – (2023-2024)

CHEMISTRY

Time allowed: 3.00 Hours] [Maximum Marks: 70

Instructions: 1) Check the question paper for fairness of printing. If there is any lack of fairness, inform the Hall Supervisor immediately.

2) Use **Blue** or **Black** ink to write and underline and pencil to draw diagrams

PART – I

Note : (i) Answer **all** the questions. **[15x1=15]**

(ii) Choose the most appropriate answer from the given **four** alternatives and write the option code and the corresponding answer.

1. Wolframite ore is separated from tinstone by the process of _____

a) Smelting b) Roasting

c) Roasting d) Electromagnetic separation

2. When boric acid reacted with ethyl alcohol in presence of Conc. sulphuric acid it gives _____

a) Borax b) Trialkyl borate

c) Sodium borate d) Octahedral borax

3. In which of the following, NH_3 is not used?

a) Nessler's reagent

b) Reagent for the analysis of IV group basic radical

c) Reagent for the analysis of III group basic radical

d) Tollen's reagent

4. Identify the correct reason for lanthanide contraction.

a) decreasing nuclear charge b) decreasing screening effect

c) increasing nuclear charge d) negligible screening effect

5. The geometry and hybridization of $[Fe(CO)_5]$

a) Trigonal planar, dsp^3 b) Octahedral, dsp^2

c) Trigonal Bipyramidal, dsp^3 d) Octahedral, sp^3d^2

6. In AAA type each sphere is arranged in contact with _____ of its neighbours.

a) six b) four c) two d) none of these

7. For a reaction, $2A + B \rightarrow C$, the rate of appearance of C at time 't' is 1.2×10^{-4} mol L^1s^1. Identify the rate of reaction.

a) 4×10^{-5}mol L^{-1} s^{-1} b) 4.5×10^{-1} mol L^{-1} s^{-1}

c) 3.6×10^{-4} mol L^{-1} s^{-1} d) 4×10^{-1} mol L^{-1} s^{-1}

8. When the pH of a solution is 2, the hydrogen ion concentration in moles litre^{-1} is

a) 1×10^{-12} mol L^{-1} s^{-1} b) 1×10^{-2} mol L^{-1} s^{-1}

c) 1×10^{-7} mol L^{-1} s^{-1} d) 1×10^{-4} mol L^{-1} s^{-1}

9. Which among the following has same equivalent and molar conductance?

a) H_2SO_4 b) CH_3COOH c) NaCl d) Na_2SO_4

10. Which one of the following is an example for homogeneous catalysis?

a) manufacture of ammonia by Haber's process

b) manufacture of sulphuric acid by contact process

c) hydrogenation of oil

d) Hydrolysis of sucrose in presence of all HCl

11. The compound that does not undergo Cannizaro reaction is:

a) Formaldehyde b) Acetaldehyde

c) Benzaldehyde d) Trimethyl acetaldehyde

12. Which order of arrangement is correct in terms of the strength of the acid?

a) CH_3-$CH_2COOH > CH_3COOH < HCOOH < ClCH_2COOH$

b) $ClCH_2COOH < HCOOH < CH_3COOH < CH_3CH_2COOH$

c) CH_3-$CH_2COOH < CH_3COOH < HCOOH < ClCH_2COOH$

d) $HCOOH > CH_3CH_2COOH < CH_3COOH > ClCH_2COOH$

13. The correct order of basic strength in the case of alkyl substituted amines is

a) $(CH_3)_2NH > CH_3$-$NH_2 > (CH_3)_3N > NH_3$

b) $NH_3 > (CH_3)_3$-$N > CH_3NH_2 > (CH_3)_2NH$

c) $(CH_3)_3N < CH_3$-$NH_2 > NH_3 < (CH_3)_2NH$

d) $(CH_3)_2NH_2 < (CH_3)$-$N < NH_3 > (CH_3)_2NH$

14. The number of asymmetric carbon atoms present in glucose and fructose are

a) 3, 4 b) 4, 3 c) 4, 5 d) 5, 4

15. Commonly used antiseptic 'dettol' is a mixture of

a) O-chlorophenozylenol + terpineol b) O-cresol + terpeneol

c) phenol + terpineol d) chloroxylenol + terpineol

PART – II

Note : Answer **any six** questions. Question No. **24** is **compulsory**. **[6x2=12]**

16. How will you identify presence of borate radical?

17. How is pure phosphine prepared from phosphorous acid?

18. Write about impurity defect.

19. Give the examples for first order reaction.

20. Write the structures of compounds whose IUPAC names as follows.

i) 1,1-Phenylpropan-2-ol

ii) 3-cyclohexylpentan-3-ol

21. What is Libermann's nitroso test?

22. Why cannot aromatic primary amines be prepared by Gabriel phthalimide synthesis?

23. Which forces are involved in holding the drugs to the active site of enzymes?

24. How will you convert diethylamineinto

i) N, N – diethylacetamide?

ii) N – nitrosodiethylamine?

PART – III

Note : Answer **any six** questions. Question No. **33** is **compulsory**. **[6x3=18]**

25. Explain about aluminothermic process.

26. Write down tests for sulphate/sulphuric acid.

27. Explain Ionisation & Hydration isomerism with example.

28. When the dilution increases by 100 times, the dissociation increases by 10 times. Justify this statement.

29. How does tertiary alcohol undergoes dehydration to alkene with a mechanism?

30. Explain the Test for Aldehydes.

31. What happens when D-glucose is treated with the following reagents?

i) HI ii) Bromine water iii) HNO3

32. What are the biological importance of proteins?

33. Calculate the emf of the following cell at 25°C using Nernst equation.

Cu (s) | Cu^{2+} (0.25 aq, M) || Fe^{3+} (0.05 aqM)| Fe^{2+} (0.1 aq M) pt (s)

Given: E_0Fe^{3+} | Fe^{2+} = 0.77VE_0Cu | Cu^{2+} = 0.34 V

PART – IV

Note : Answer **all** the questions. **[5x5=25]**

34. a) i) Write the equation for the extraction of silver by leaching with sodium cyanide and show that the leaching process is redox reaction.

ii) Explain about structure and uses of boric acid.

(OR)

b) i) How will you manufacture the chlorine by Deacon's process?

ii) How does the neutral alkaline potassium permanganate solution react with (a) Nitrites (b) oxalic acid (c) ferrous salts? Write the ionic equations for the reactions.

35. a) i) Explain the Classification of metallic carbonyls based on structure.

ii) Determine packing efficiency in simple cubic unit cell.

(OR)

b) i) What is solubility product? How it is used to decide the precipitation of ions.

ii) Differentiate physisorption and chemisorption.

36. a) How will you bring about the following conversions in not more than two steps?

i) Benazaldehyde to α - Hydroxyphenylacetic acid

ii) Bromobenzene to 1-Phenylethanol

iii) Propanone to Propene

(OR)

b) How will you prepare nitromethane from

i) Methyl bromide?

ii) α - halocarboxylic acid?

iii) Methane?

37. a) Write about classification of carbohydrates.

(OR)

b) i) Differentiate between addition and condensation polymers based on the mode of polymerisation. Give one example of each type.

ii) Write a note on preservatives.

38. a) i) For a first order reaction the rate constant at 500K is 8×10^{4} s^{-1} Calculate the frequency factor, if the energy of activation for the reaction is 190 kJ mol^{-1}.

ii) The time for half change in a first order decomposition of a substance A is 60 seconds. Calculate the rate constant. How much of A will be left after 180 seconds?

(OR)

b) An organic compound (A) of molecular formula C_6H_6O on reaction with benzene diazonium chloride gives (B) dye. (A) on reaction with $K_2Cr_2O_7$ gives (C) of molecular formula $C_6H_4O_2$. (C) on reaction with H_2 in presence of nickel gives (D). Identify A, B , C , D.