

Model Question- 8
Chemistry XII

Time :3 hours

Full marks: 75

Attempt all questions

Group 'A'

Tick the correct answer. (11×1 = 11)

1. Equivalent weight of KMnO_4 in acidic medium is
c) 31.6 b. 13.8 c. 52.6 d. 15
2. For $\text{Cu}(\text{OH})_2$, $K_{sp} = 1.6 \times 10^{-19}$. What is the molar solubility of $\text{Cu}(\text{OH})_2$?
a. $3.4 \times 10^{-7} \text{ M}$ b. $2.7 \times 10^{-11} \text{ M}$ c. $6.4 \times 10^{-7} \text{ M}$ d. $5.1 \times 10^{-10} \text{ M}$
3. A first-order reaction is 50% completed in $1.26 \times 10^{14} \text{ s}$. How much time would it take for 100% completion?
a. $1.26 \times 10^{15} \text{ s}$ b. $2.52 \times 10^{28} \text{ s}$ c. $2.52 \times 10^{14} \text{ s}$ d. infinite
4. While charging the lead storage battery.
a. PbSO_4 anode is reduced to Pb. b. PbSO_4 cathode is reduced to
c. Pb. PbSO_4 cathode is oxidized to Pb. d. PbSO_4 anode is oxidized to PbO_2 .
5. In industrial processes, transition elements and their oxides are used as
a. surfactants
b. insecticides
c. catalyst
d. any of them
6. In blast furnace iron oxide is reduced by
a. silica b. carbon monoxide c. carbon d. lime stone
7. The addition of 1% ethanol to bottle of chloroform acts as
a. Positive catalyst b. Negative catalyst c. Biocatalyst d. Autocatalyst
8. The bond angle of C-O-C in ether is about
a. 180°C b. 109.5°C c. 110°C d. 105°C
9. Gypsum is used in cement for
a. Colour b. strength c. controlling setting time d. none
10. Half-rag paper usually contains
a. 50% rag fibre and 50% cellulose b. 25% ragfibre and 75% cellulose
c. 75% ragfibre and 25% cellulose d. none
11. Penetrating power of proton is
a. Greater than electron b. Lesser than electron
c. Greater than neutron d. None

Group 'B'

Short answer questions. (8 × 5=40)

12. Define acidity and basicity. 1.4 gm of dolomite (a mixture of CaCO_3 and MgCO_3) was dissolved in 200ml of 0.2 N HCl solution. After the reaction was completed; the resulting solution was diluted to 250 ml and 10 ml of this solution required 12 ml of N/30 NaOH Solution for Neutralization. Calculate the percentage composition of the mixture.

[1+4]

Or

What is meant by proper orientation and effective collision? What will be the initial rate of reaction if its rate constant is $1 \times 10^{-3} \text{ min}^{-1}$ and the concentration of the reactant is 0.2 mol l^{-1} . How much the reactant will be converted into the product in 500 minutes? [2+3]

13. Distinguish between extensive and intensive properties. State Hess's law of constant heat summation. The latent heat of fusion of ice is 336 J/g . Calculate the molar entropy of fusion of ice at its melting point. [2+1+2]

14. What are the main assumptions of CFT? Explain the crystal field splitting in octahedral complexes. [3+2]

15. Draw a well labelled diagram for roasting and distillation during the extraction of mercury from cinnabar. What is lithopone? Write its one important use. Write the chemical reaction involved in zone of combustion of blast furnace during the extraction of cast iron. [2+2+1]

16. Match the items of column I and II [0.5+0.5+0.5+0.5+0.5]

Column I	Column II
i. $\text{S}_{\text{N}}1$ reaction	a. Fittig reaction
ii. Chloroform and Acetone	b. Wurtz-Fittig reaction
iii. Biphenyl	c. $3^{\circ} < 2^{\circ} < 1^{\circ}$ haloalkanes
iv. Chlorobenzene and Chloral	d. Saytzeff's rule
v. Elimination of HX from alkyl halide	e. Chlorobromocarbons
	f. Racemization
	g. Sleeping tablets
	h. DDT

Write the reaction for each match. [0.5+0.5+0.5+0.5+0.5]

Or

What happens when ethoxy ethane treated with

- Cl_2 in dark
- Cl_2 in light
- Air and light
- Cold and conc. H_2SO_4
- Excess HI/Δ

17. A list of compounds are given as follows:

Phenylacetic acid, toluene, benzyl cyanide, benzene, benzyl chloride

From the above list of compounds, prepare a sequence of reaction with suitable conditions and reactions.

18. Write the equations for

- excess ethanol is heated with conc. H_2SO_4 at 140°C
- ethanol is heated with excess H_2SO_4 at 160°C - 170°C
- 2-methylpropan-2-ol vapour is passed through heated copper at 300°C
- Ethanol is refluxed with SOCl_2 in the presence of pyridine
- Ethanol reacts with sodium metal

19. A. Mention an important function of each of the followings:

- Antipyretic
- PVC
- Dacron

B. Write the application of ^{60}Co and ^{99}Te .

Group 'C'

Long answer questions

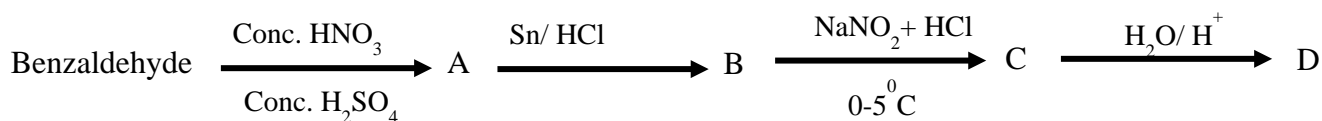
(3× 8=24)

20. a) What is the solubility product principle. discuss three conditions of solubility product principle. [2]
- b) Calculate the pH of $1 \times 10^{-8}\text{M}$ HCl solution. [2]
- c) Calculate the pH of 0.1 M acetic acid ($K_a = 1.8 \times 10^{-5}$) [2]
- d) The solubility of AgCl in water at 25°C is found to be 1.06×10^{-5} mole L^{-1} . Calculate the solubility product of AgCl at this temperature. [2]

Or

- a. The heat of formation of carbon dioxide, water and glucose are -395, -269 and -1169KJ respectively. Calculate the heat of combustion of glucose. [4]
- b. What are secondary cell. Describe about Lead storage batteries. [4]
21. A) Arrange the given compounds according to their ascending order of acidic strength and justify your order.
Phenol, O-nitrophenol, 2, 4, 6-trinitrophenol [1+2]
- B) 2, 4, 6-trinitrophenol gives effervescence with NaHCO_3 but phenol does not why? [2]
- C) Convert Phenol to Aspirin. Write the use of Aspirin [2+1]

11. Identify the compounds A, B, C and D in the following sequence of reactions.



ii) Convert benzaldehyde to benzene.

iii) Prepare benzaldehyde from benzal chloride.

[4+2+2]

Or

- a. Write down the structure and IUPAC name of isomeric amines of molecular formula $\text{C}_3\text{H}_9\text{N}$. how would you separate them from the mixture by Hoffmann's method? [2+3]
- b. What happens when ethanoic acid is
- Reacted with NaHCO_3
 - Refluxed with SOCl_2
 - Reduced with LiAlH_4

[1+1+1]