

## MODEL QUESTION SET 2076

Class: 12  
Subject: Chemistry

Full Mark: 75  
Time: 3:00 hours

Candidates are required to give their answers in their own words as far as practicable. The figures in the margin indicate full marks.

### Group A

Attempt any **fifteen** questions: (15 × 2 = 30)

1. Draw orbital diagram of ethene molecule showing  $\sigma$  and  $\pi$  bonds. Among  $\sigma$  and  $\pi$  bond, which is stronger in nature?
2. Define semi-molar solution. What weight of Mg-metal can be completely dissolved by 20 ml of semi-molar solution of  $H_2SO_4$ ?
3. What is meant by solubility product? The solubility product of  $Mg(OH)_2$  at 25° C is  $1.4 \times 10^{-11}$ . Find the solubility of  $Mg(OH)_2$  at this temperature.
4. Define equivalent conductance. The specific conductance of 0.12 N solution of an electrolyte is  $0.024 \text{ ohm}^{-1} \text{ cm}^{-1}$ . Find its equivalent conductance.
5. State first law of thermodynamics. Write its limitation.
6. What is meant by spontaneous process? What is the condition of spontaneity for reaction at  $\Delta H$  +ve and  $\Delta S$  +ve condition?
7. Write three different rate law expressions for the reaction;  $A+B \rightarrow C+D$ , if it is second order. Also, write the unit of second order reaction.
8. How do you obtain benzene from toluene and toluene from benzene?
9. Identify the major products; A, B, C, D.

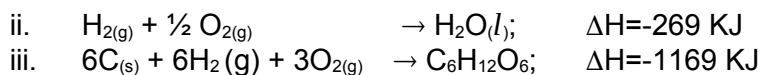


10. Starting from phenol, how would you obtain (i) Anisole (ii) Picric acid?
11. Write suitable steps of reaction to convert ethoxyethane to methoxy methane.
12. Name a single compound which gives positive response to all DNP test, Iodoform test and Tollen's test. What happens when that compound is heated with dilute NaOH solution?
13. An organic acid on heating with ethanol in presence of conc.  $H_2SO_4$  gives ester of formula  $C_4H_8O_2$ . Identify the compounds and write the reaction involved.
14. Write the major product obtained when nitrobenzene is treated with (i)  $Zn/NH_4Cl$  (ii)  $Sn/HCl$ .
15. Write 1°, 2° and 3° isomers of  $C_3H_9N$ . Among them which can give carbylamine test positive?
16. Define sugar and non-sugar with examples.
17. Chemically, what are fats and oils? What happens when fat or oil is hydrolyzed in alkaline medium?
18. Differentiate homopolymer from co-polymer with example.
19. What are antipyretics? How they differ from analgesics?
20. How corrosive sublimate is converted into calomel and vice-versa?
21. Write any one use of each.
  - i. Red oxide of copper
  - ii. Lunar caustic
  - iii. Zinc white
  - iv. Mohr's salt
22. Among Bessemer process and open Hearth process of steel manufacture, which one is more advantageous? Give reason to support your answer.

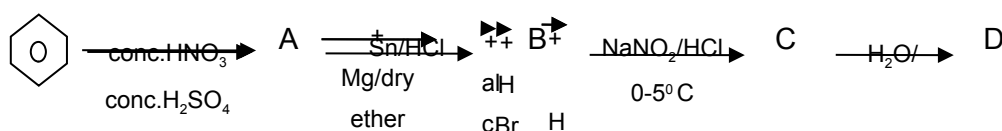
### Group B

Attempt any **five** questions: (5 × 5 = 25)

23. State Ostwald's dilution law. What is its limitation? What will be resultant  $P^H$  when 500 ml of HCl solution with  $P^H$  3 is mixed with 300 ml of NaOH solution with  $P^H$  11? (1+1+3)
24. In which aspects electrolytic cell differs from galvanic cell? Silver is electroplated on metallic vessel of surface area  $800 \text{ cm}^2$  by passing current of 0.2 ampere for 3 hours. Calculate the thickness of silver deposited. (Given: density of Ag =  $10.5 \text{ gm/cc}$ , atomic weight of Ag =  $108 \text{ amu}$ ) (2+3)
25. State Hess's law of constant heat summation. Calculate the heat of combustion of glucose from following data. (2+3)
  - i.  $C_{(s)} + O_{2(g)} \rightarrow CO_{2(g)}$ ;  $\Delta H = -395 \text{ KJ}$



26. identify the following compounds:



- What happens when B is heated with chloroform in presence of KOH?
- What happens when C is heated with  $\text{Cu}_2\text{Cl}_2$  in HCl?
- What happens when C is reacted with D in cold condition? (2+3)

27. Describe lab preparation method of aniline with well labelled diagram. Why aniline is less basic than ethanamine? (4+1)

28. An alcohol A reacts with thionyl chloride to produce B. The compound B on heating with alcoholic KOH give compound C. The compound C on ozonolysis give ethanal and methanal. If A responses positive iodoform test, identify A, B and C with the chemical reactions involved.

29. Describe steps involved in extraction of zinc from zinc blende.

### Group C

Attempt any **two** questions: (2 × 10 = 20)

30. a. What is meant by rate of chemical reaction? Explain any four factors that affect the rate of chemical reaction. (1+4)  
 b. Define the terms: (i) order (ii) Molecularity (iii) Half-life of reaction

A first order reaction takes 100 minutes to complete 60% of reactants into products. What time will it take to complete 90% of the reactants into products? (3+2)

31. Explain the laboratory method of preparation of nitrobenzene with well labelled diagram. What happens when nitrobenzene is reduced in alkaline medium of zinc in aqueous sodium hydroxide? Why nitrobenzene give meta substituted product during electrophilic substitution reactions? Convert nitrobenzene into m-bromophenol. (5+1+2+2)

32. a. Write an example of the following reactions: (5x1)  
 i. Williamson's etherification  
 ii. Cannizaro's reaction  
 iii. Decarboxylation reaction  
 iv. Hoffmann's bromamide reaction  
 v. Coupling reaction  
 b. Write any two methods of preparation of ethanoic acid. Compare the acidic strength of ethanoic acid with methanoic acid. Which chemical test can distinguish methanoic acid from ethanoic acid? (2+1.5+1.5)

33. Write short notes on (any two): (2x5=10)  
 i. Selection of indicator in acid base titration  
 ii. Second law of thermodynamics  
 iii. Separation of 1<sup>o</sup>, 2<sup>o</sup> and 3<sup>o</sup> amines by Hoffmann's method  
 iv. Chemistry of white vitriol