NEB-GRADE XII
2081 (2024)
Chemistry
(New course)

(For general stream student whose first two digits of registration number starts from 78, 79 and 80)

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

Attempt **all** the questions.

Group 'A' [11×1=11]

Rewrite the correct option of each question in your answer sheet.

1. A chemical reaction occurs as follows:

   $NaOH+H_3PO_4 \rightarrow NaH_2PO_4+H_2O$

   What is the equivalent weight of H_3PO_4?

   A) 25 B) 49 C) 59 D) 98

2. If 0.01M solution of acetic acid is 0.01% ionised, what will be the dissociation constant of acetic acid ?

   A) 1×10^{-3} B) 1×10^{-6} C) 1×10^{-8} D) 1×10^{-10}

3. If the rate of reaction is equal to the rate constant, what will be the order of reaction ?

   A) Zero B) First C) Second D) Third

4. Standard electrode potentials of four metals P, Q, R and S are *+0.34V, -0.25V, -2.93V* and *+0.85V*, respectively. Which is the correct arrangement in the order of decreasing reactivity ?

   A) S>P>Q>R B) Q>R>P>S C) R>Q>P>S D) R>S>Q>P

5. What feature of transition metals makes them suitable to act as catalyst ?

   A) Large ionic charge B) Variable oxidation state

   C) Highly reactive nature

   D) Large surface area for the reactant to be absorbed

6. Which of the following metal ions shows green color in its salt ?

   A) Ti^{3+} B) Cr^{3+} C) Mn^{2+} D) Fe^{2+}

Contd...

7. $Benzene \xrightarrow[Anhy.AlCl_3]{CH_3Cl} 'X' \xrightarrow[[O]]{CrO_2/H^+} 'Y'$. If the compound 'Y' is heated with acid anhydride in the presence of sodium acetate, what will it give ?

A) Cinnamic acid B) Picric acid

C) Benzoic acid D) Phthalic acid

8. Which of the following compounds gives positive Tollen's test as well as Iodoform test ?

A) Propanone B) Ethanol

C) Ethanal D) Methanal

9. Which one of the following is most basic in nature?

A) NH_3 B) CH_3NH_2 C) $(CH_3)_2NH$ D) $C_6H_5NH_2$

10. Which of the following compounds reacts with chlorobenze to form DDT?

A) Carbonyl chloride B) Acetone C) Chloral D) Chloroform

11. If you are asked to prepare a primary alcohol using Grignard's reagent, what will you start with ?

A) Methanal B) Ethanal

C) Propanone D) Acetyl chloride

Sub.Code : 3021'R'

NEB-GRADE XII

2081 (2024)

Chemistry

(New course)

or general stream students whose first two digits of registration number start from 78, 79 and 80)

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

me: 3 hrs. **Full Marks: 75**

tempt **all** the questions.

Group 'A'

estion No. 1 to 11 (Multiple Choice Questions) will be provided after 30 minutes of rting examination. Rewrite its (MCQ) correct options (answer) in the same answer et.

Group 'B' [8×5=40]

Standard reduction potentials of Cu^{2+}/Cu and Fe^{2+}/Fe are +0.34V and -0.44V, respectively.

a) Write down the cell notation indicating anode and cathode. [1]

b) Calculate the standard emf of the cell. [2]

c) Write the complete cell reaction. [2]

Or

Define heat of combustion.

Heat of combustion of carbon (s), sulphur (s) and carbon disulphide (*l*) are -395 KJ/mol, -295 KJ/mol and -1110 KJ/mol, respectively. Calculate the heat of formation of $CS_2(l)$. [1+4]

3. Define the term pH of a solution.

Calculate the hydroxyl ion concentration in mole/litre of a solution whose pH is 4.7. Also determine the weight of NaOH required to produce these ions in one litre of the solution. [1+4]

14. A coinage metal (M) of electronic configuration (Ar) $3d^{10}, 4s^1$ belongs to group IB in the periodic table.

a) Draw a blast furnace for the smelting process during the extraction of (M) using its chief ore. [2]

b) Explain the different chemical reactions involved during the formation of matte in the furnace. [3]

15. a) Give a reaction for the preparation of corrosive sublimate. [1]

b) What is the action of corrosive sublimate with [3]

i) KI solution ii) $SnCl_2$ solution iii) NH_4OH soultion ?

c) Mention any two important uses of corrosive sublimate. [1]

Contd...

16. Starting from benzene, how would you prepare nitrobenzene ? How would you convert nitrobenzene into :

i) azoxybenzene ii) P-aminophenol

iii) aniline iv) azobenzene ? [1+4]

17. $(A) \xrightarrow{aq\ NaOH} (B) \xrightarrow[[O]]{K_2Cr_2O_7,\ H^+} \text{Propanone}$

i) Identify the compounds (A) and (B).

ii) Starting from compound (A), how would you obtain 2,3-dimethylbutane?

iii) Convert compound (B) into propene.

iv) Predict the product, when compound (A) is heated with sodium methoxide. [2+1+1+1]

Or

Make a correct sequence of reactions using the suitable conditions from the following compounds. [5]

Benzoin, Toluene, Benzene diazonium chloride, Phenol, Benzaldehyde and Benzene

18. Write down a chemical equation of each of the following. [5]

i) Carbonylation reaction ii) Fehling's test

iii) Aldol condensation iv) Williamson's ether synthesis

v) 2, 4- DNP test

19. Write an example of each of primary (1°) and secondary (2°) alcohol. How is Victor-Meyer's test applied to distinguish between them? [1+4]

Group 'C' [3×8=24]

20. The concentration of H_2SO_4 solution can be determined by the titration with standard Na_2CO_3 solution.

i) Is the Na_2CO_3 solution primary standard ? Why ? [2]

ii) Differentiate between equivalent point and end point. [2]

iii) 100 ml of Na_2CO_3 solution contains 0.53 g of Na_2CO_3. If 10 ml of this solution is added to 'x' ml of water to obtain 0.01M Na_2CO_3 solution, calculate the value of x. [4]

Or

a) Define half-life of a reaction. Deduce the relation that the half life for a reaction is directly proportional to the initial concentration of reactant. [1+2]

Contd...

reaction;

$$2NO_{(g)} + Cl_{2(g)} \rightarrow 2NOCl_{(g)}$$

Expt No.	Initial [NO] M	Initial [Cl_2] M	Initial rate of disappearance of Cl_2 (M/min.)
1	0.15	0.15	0.60
2	0.15	0.30	1.20
3	0.30	0.15	2.40
4	0.25	0.25	x

(a) Write the expression for rate law. [2]

(b) Calculate the value of K and specify its unit. [2]

(c) Find the value of x. [1]

21. a) The vapour of organic compound (A) if inhaled causes the loss of consciousness and if heated with conc. HNO_3 forms a component of tear gas.

i) How would you prepare compound (A) by using one of the isomers of C_3H_6O? [2]

ii) What happens when compound (A) is : (a) exposed in air (b) heated with Ag powder (c) condensed with acetone, and (d) heated with aniline in the presence of alc. KOH ? [4]

b) Give reasons : [2]

i) Ether is stored in the bottle containing iron wire.

ii) Though ethanol is an organic compound, it is soluble in water.

Or

A sequence of reaction in general form is expressed as:

$$A \xrightarrow{PCl_5} B \xrightarrow[\Delta]{NH_3} C \xrightarrow[\Delta]{Br_2/NaOH} D \xrightarrow[(0\text{-}5^\circ C)]{NaNO_2/HCl} E$$

Compound A is a carboxylic acid that produces ethanoic anhydride on being heated with P_2O_5.

a) Identify A,B,C,D and E with reactions involved. [5]

b) If the compound A undergoes Hell-Volhard-Zelinsky reaction, write the reactions leading to the final product. [1]

c) What product will be formed if compound B is treated with ethanol ? [1]

Contd

d) How would you convert compound 'E' into methanal ? [1]

22. a) What is Portland cement ? List out the major constituents of Portland cement. [2]

b) Give the structural formula of monomer and a use of each of the following

i) Nylon 6,6 ii) Polystyrene [2]

c) Differentiate between:

i) Nuclear reactions and chemical reactions. [2]

ii) Fibrous and non-fibrous raw materials for the paper production [2]

-0-