

SET-C

GRADE: XII
SUBJECT: CHEMISTRY
SUBJECT CODE: 302
TIME: 3 HRS

F.M:75
P.M:27

ATTEMPT ALL THE QUESTIONS.

GROUP 'A'

Circle the best alternative to the following questions. [11x1=11]

- 40 is the equivalent weight of;
a) CaO
b) NaOH
c) Ca(OH)_2
d) Na_2SO_4
- What volume of N/2 HCl must be diluted to give 2 L of N/5 HCl?
a) 800 ml
b) 600 ml
c) 400 ml
d) 200 ml
- Order of a reaction can have
a) Positive value
b) Whole number
c) Fractional value
d) All
- The rate at which a substance reacts, depends on its;
a. Atomic mass
b. Active mass
c. Equivalent mass
d. Molecular mass
- Which of the following substance is not a primary standard?
a) Mohr's salt
b) Hydrated oxalic acid
c) Anhydrous Na_2CO_3
d) KMnO_4
- The two chemical species that differ by one H^+ is;
a) Conjugate acid
b) Conjugate base
c) Conjugate acid base pair
d) Amphoteric substance
- Rectified spirit is;
e. 100% pure ethanol
f. 95% ethanol + 5% water
g. Ethanol + water + petrol
h. 95% ethanol + 5% methanol
- Chloropicrin is;
a) Laughing gas
b) Brown gas
c) Antiseptic
d) Tear gas

9. When benzene diazonium chloride is heated with the CuCl and HCl, chlorobenzene is formed. The reaction is
- Sandmeyer reaction
 - Gattermann reaction
 - Rasching's reaction
 - All of the above
10. Which of the following compound is non-polar;
- CCl_4
 - CHCl_3
 - CH_2Cl_2
 - HCl
11. Which of the following alcohol gives ketone on oxidation?
- Primary
 - Secondary
 - Tertiary
 - None of the above

GROUP 'B'

Give short answer to the following questions. [8×5=40]

12. Order of a reaction can experimentally be determined by comparing the rate of reaction with change in concentration of particular reactant.
- Define pseudo order of a reaction. [1]
 - Write the unit of rate constant of zero order reaction. [1]
 - Give any two differences between order and molecularity of reaction. [2]
 - Mention one example of first order chemical reaction. [1]
13. Concept of acid and base can be explained on the basis of Arrhenius, Bronsted - Lowry and Lewis concept.
- Define acid in terms of Bronsted-Lowry concept. [1]
 - Define base in terms of Lewis concept. [1]
 - NH_3 is not Arrhenius base but it is Bronsted base. Why? [2]
 - Water is amphoteric nature according to Bronsted Lowry concept. Explain. [2]

OR,

Derive the integrated rate equation of zero order reaction. [3]

For the give reaction, $\text{Cl}_2 + \text{NO} \rightarrow 2\text{NOCl}$

The data obtained are,

Experiment	$[\text{Cl}_2]$	$[\text{NO}]$	Rate ($\text{molL}^{-1}\text{s}^{-1}$)
1	0.020	0.010	2.40×10^{-4}
2	0.020	0.030	2.16×10^{-3}
3	0.040	0.030	4.32×10^{-3}

Determine:

[3+2]

- Order of reaction with respect to Cl_2 and NO and the overall reaction.
 - If the concentration of Cl_2 is $[0.50 \text{ molL}^{-1}]$ and NO is $[0.40 \text{ molL}^{-1}]$, what is the rate?
14. Define the term; [1+1]
- Titration error
 - Normality factor
- What volume of 12 M NaOH and 2 M NaOH should be mixed to get 2 L of 9 M NaOH? [3]
15. A primary alkyl halide **(A)** $\text{C}_4\text{H}_9\text{Br}$ when reacts with alc.KOH gives compound **(B)** which when reacted with HBr gave **(C)** which is an isomer of **(A)**. When **(A)** is reacted with sodium metal it gives compound **(D)**, C_8H_{18} which is different from the compound when n-butyl bromide is reacted with Na. Give the structure of **(A)**, **(B)**, **(C)** and **(D)** and write equation for all the reactions. [5]
16. Give an example of each [5×1=5]

- a. Wurtz reaction
 - b. Carbylamines reaction
 - c. Coupling reaction
 - d. Kolbe's reaction
 - e. Reimer-Tiamann reaction
17. Write the structural formula with IUPAC name of each primary and secondary alcohol from C_3H_8O . How would you prepare ethanol from diborane? Write with necessary chemical reactions. Define fermentation. [2+2+1]
18. Write short note on [2.5 +2.5]
- a. Oxo process
 - b. Test of phenol
19. Chlorobenzene is a colorless, flammable liquid with an aromatic, almond-like odor. Some of it will dissolve in water, but it readily evaporates into air.
- a) Chlorine in chlorobenzene is ortho and para director towards electrophilic substitution reaction. Give reason with all resonating structures. [3]
 - b) How would you convert chlorobenzene in to: [1+1]
 - i. DDT
 - ii. Diphenyl

OR,

An aromatic compound 'A' undergoes Sandmeyer's reaction to give 'B'. The compound B is reduced with Ni-Al in presence of alkali to give 'C'. The compound 'C' further reacts with CH_3Cl in the presence of anhy. $AlCl_3$. The compound 'B' when heated with Chloral in acidic medium gives 'D'. The compound 'D' is common insecticide. Identify A, B, C and D giving complete reaction. [5]

GROUP 'C'

Give long answer to the following questions. [3×8=24]

20. Ostwald dilution law is used for quantitative aspect of weak electrolyte.
- a. Derive the relation between degree of ionization and concentration. [3]
 - b. Write limitation of Ostwald dilution law. [1]
- Calculate the pH of solution obtained by mixing 200 ml of HCl solution of pH=2 with 300 ml of NaOH solution of pH=12. [4]
21. Volumetric analysis is the analytical method wherein the concentration of a substance in a solution is estimated by adding exactly the same number of equivalents of another substance;
- a) What are the requisites (requirements) for a substance to be primary standard? [2]
 - b) Differentiate between Acid base titration and Redox titration. [2]
 - c) A piece of Mg ribbon is completely dissolved in 40 cc of N/10 HCl .The excess of acid required 15 cc of N/5 NaOH for complete neutralization. Find the weight of Mg. [4]

OR,

The reaction rate or rate of reaction is the speed at which a chemical reaction takes place.

- a. Derive the integrated rate equation for 1st order reaction. [3]
 - b. Define half-life period of a reaction [1]
 - c. Calculate the half-life period of first order reaction when the rate constant is 5 year⁻¹. [2]
 - d. Draw the energy profile diagram for exothermic reaction showing all the parameters (labeling). [2]
22. Mention the principle of preparation of chloroform from ethyl alcohol and acetone separately. Starting from trichloromethane, how would you prepare following?
[4+1+1+1+1]
- a. Chloroform
 - b. Ethyne

- c. Chloropicrin
- d. Phosgene

OR,

Alcohol is a colorless volatile flammable liquid which is produced by the natural fermentation of sugars and is the intoxicating constituent of wine, beer, spirits, and other drinks, and is also used as an industrial solvent and as fuel

- a. Describe Victor Meyer's method to distinguish propan-2-ol and 2-methyl propan-2-ol. [4]
- b. How is alcohol manufactured from sucrose? Write with reactions. [2]
- c. Give an example of dihydric alcohol. [1]
- d. What happens when alcohol is heated with alumina? [1]

THE END