Sub.Code : 3021'B'

NEB-GRADE XII

2079 (2022)

Chemistry

Grade Increment (Supplementary) Examination

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

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

Attempt **all** the questions.

Group 'A' 11×1=11

Rewrite the correct options of each questions in your answer sheet.

1. In reaction of chloroform with primary amine in ethanolic solution of KOH is termed as
   A) Hoffmann's reaction B) Carbylamine reaction
   C) Reimer- Tiemann's reaction D) Kolbe's reaction
2. An organic compound (P) undergoes reduction with $LiAlH_4$ to produce (Q). When (Q) is heated with copper at 300°C, (P) is again produced. The compound (P) is
   A) CH_3-CHO B) CH_3-CO-CH_3
   C) CH_3CH_2-OH D) $CH_3O.CH_3$
3. Which one is the laboratory test of alcohol ?
   A) Iodoform test B) Victor-Mayar's test
   C) Esterification test D) Oxidation test
4. Chloroform does not give white ppt. with silver nitrate because.
   A) $AgNO_3$ is ionic compound.
   B) $CHCl_3$ doesnot ionise with water
   C) $CHCl_3$ is chemically inert.
   D) $AgNO_3$ doesnot ionise with water
5. Vinegar contains
   A) 10-20% acetic acid B) 10% acetic acid
   C) 7-8% acetic acid C) 100% acetic acid
6. If a filter paper soaked by Hg^{++} ions is exposed in a gas jar containing NH_3 the filter paper will turn,
   A) Black B) Red C) Brown D) Blue

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7. Which of the following compound used to silvering a mirror ?
   A) AgCl B) $AgNO_3$ C) AgS D) AgBr
8. Value of ionic product of water at 393 K is,
   A) Less than 1×10^{-14} B) Greater than 1×10^{-14}
   C) Equal to 1×10^{-15} D) Equal to 1×10^{-7}
9. Which of the following conditions are correct
   A) $\Delta H = O, \Delta S < O$ B) $\Delta H > O, \Delta S > O$
   C) $\Delta H < O, \Delta S < O$ D) $\Delta H > O, \Delta S < O$
10. If the weight of metal and chlorine in a metal chloride is 1:2, the equivalent weight of the metal is
    A) 71 B) 35.5 C) 17.5 D) 8
11. For rate law experiment, Two gases (x) and any Y are filled in a containes. The rate law for the reaction has been found to be rate = $K [X]^2 [Y]$. What will be the rate of reaction when pressure is doubled ?
    A) The rate will be doubled B) The rate will becomes four times
    C) The rate will becomes six times D) The rate will becomes eight times

Group 'B' 8×5=40

12. i) Give the statement of first law of thermodynamics.
    ii) Deduce mathematical equation for it
    iii) Show that heat change at constant volume is change in internal energy.
    iv) Mention a major limitation of first law of thermodynamics. 1+2+1+1

    Or

    Standard hydrogen electrode is an electrode that scientists use for reference on all half-cell potential reactions.
    i) What is meant by reference electrode ? 1
    ii) For the measurement of standard electrode potential of silver E^oAg^+/Ag, Hydrogen electrode is connected with it,
    a) Represent an electrochemical cell notation
    b) Indicate cathode and anode.
    c) If standard emf of the cell [E_o-cell] is 0.80v. calculate the standard electrode potential $E^0 Ag^+/Ag$. 2+1+1
13. 0.70 gm of a sample of $Na_2CO_3\times H_2O$ were dissolved in water and volume was made to 100 ml. 20ml of this solution required 19.8ml of $\frac{N}{10}$ HCl for complete neutralization.
    i) Name the chemical indicator used in this titration.
    ii) Calculate numerical value of x. 1+4

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14. The oxidation of different classes of alcohols given various products.
    i) Name mild and strong agents used in the oxidation of alcohol. 1
    ii) Write down the oxidation products of 1°, 2° and 3° alcohols. 4
15. For the following hypothetical reaction.

$$(A) \xrightarrow{reaction\ 1} (B) \xrightarrow{reaction\ 2} (C) \longrightarrow (D)$$

The compound (A) is an unsaturated aliphatic hydrocarbon and the compound (B) can be obtained by reduction of chlorobenzene with hydrogen in presence of Ni-Al/alkali on oxidation of (C) with CeO_2/H^+ give (D) as aromatic aldehyde.
    i) use suitable reagent and condition in the reaction I and reaction II.
    ii) Identify (A), (B) and (C) giving proper chemical reaction. 2+3
16. Write down an example of each of 1° amine, 2° amine and 3° amine giving IUPAC name. Give a test to distinguish 1° amine from 2° amine. 3+2
17. You are given an organic compound having molecular formula C_3H_7X.
    i) Write down a primary and a secondary haloalkane giving their IUPAC name.
    ii) Give proper reaction sequence to convert the primary haloalkane into the secondary haloalkane.
    iii) What product is obtained, when the secondary haloalkane is subjected to wurtz reaction.
    iv) Give reason, why are haloalkanes more reactive than haloarenes towards nucleophic substitution reaction. 1+2+1+1

OR

    a) Write down correct reaction of each for the preparation of ethanoic acid form following sets of organic compounds.
    i) CH_3CN ii) CH_3ONa iii) CH_3MgI
    b) Convert ethanoic acid into methanoic acid. 1+1+1+2
18. Write down the chemistry of blue vitriol. 5
19. Zinc is considered as non-typical element and it belongs to the element of group II B
    i) Why are the elements of group II B called volatile metal ?
    ii) Name the process of concentration of Zinc blende during the extraction of Zn.
    iii) Write chemical reaction involved in roasting during extraction of zinc.
    iv) What is meant by spelter zinc ?
    v) How is granulated zinc prepared ? (5×1)

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Group 'C' 3×8=24

20. a) Write down correct example of each of the following reactions.
    i) Wurtz reaction ii) Oxoprocess.
    iii) Esterification iv) Williamson's etherification
    v) diazotization vi) Tollens test.
    vii) Hell-volhard zelinsky reaction viii) Carbylamine reaction

Or

    a) The given table shows the different organic compounds.
    A = $C_6H_5NH_2$ E=$C_6H_5CH_3$
    B = C_6H_5OH F = $C_6H_5N_2Cl$
    C = C_6H_5CHO
    D = C_6H_6
    Make a correct reaction sequence of the above compounds and proper conditions and reagents. 6
    b) Why is amio-group protected before nitration in aniline. Write reaction fot it. 2
21. a) Cement is important materials for the constructions of building, road, bridge etc. 2+1+1+1+1
    i) Give a difference between hydraulic and non-hydraulic cement.
    ii) List the compositions of portland cement.
    iii) What is the purpose of adding gypsom during cement production.
    iv) Name any two instruments to check the quality of cement.
    v) Which is the first established state owned cement industry in Nepal ?
    b) What is meant by artificial radioactivity write an example it. 2
22. a) Give proper reason.
    i) NH_3 acts as Bronsted base but not Arrhernius base. 1+1+2+1
    ii) NaCl can't undergo hydrolysis.
    iii) Group II metal ions get precipitated as their sulphides when H_2S is passed through their acidified salts.
    iv) Ostwald's dilution law is not applicable for strong electrolyte.
    b) How many moles of Ca $(OH)_2$ must be dissolved to produce 250 ml of an queons solution of P^H 10.65 ? 3

OR

    a) For a hypothetical reaction (2A+3B $\rightarrow$ M+N), Concentration of (M) increased by $0.02ML^{-1}$ in 10 seconds. 1+1+1+1
    i) Write down rate expression for the above reaction.
    ii) Calculate the rate of formation of (M)

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iii) What is the rate of disappearance of (B) ?

iv) Define rate of reaction.

b) There are various physical and chemical factors to affect the rate of reaction such as concertration of reactant, temperature. Calalysts, surface area of reactants etc.

i) Give an example to show that surface area of reactants affect the rate of reaction. 1

ii) Draw a energy profile digram showing the effect of calalyst in the rate of reaction. 2

iii) Why does temperture increase the rate of reaction ? 1

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