Series–B

Roll No.....

Total No. of Questions–28] [Total No. of Printed Pages–16

A–855–B–XII–2325

CHEMISTRY

(Theory)

Time Allowed—3 Hours Maximum Marks—60

Candidates are required to give their answers in their own words as far as practicable.

Marks allotted to each question are indicated against it.

Special Instructions :

(i) You must write Question Paper Series in the circle at top left side of title page of your Answer-book.

(ii) While answering your Questions, you must indicate on your Answer-book the same Question No. as appears in your Question Paper.

(iii) Do not leave blank page/pages in your Answer-book.

(iv) All questions are compulsory. Answer all parts of a question together.

(v) Internal choices are given in some questions.

(vi) Answers should be brief and to the point.

(vii) Question Nos. 1 to 12 are MCQ (Multiple Choice Questions) carrying 1 mark each. Question Nos. 13 to 19 are very short answer type questions carrying 2 marks each. Question Nos. 20 to 24 are short answer type questions carrying 3 marks each. Question No. 25 is case study based question and carries 4 marks. Question Nos. 26 to 28 are long answer type questions carrying 5 marks each.

(viii) All questions given in Section–A (Multiple Choice Questions) are to be attempt on OMR sheet provided with Answer book.

SECTION–A

(Multiple Choice Questions)

1. Molarity of pure water is : 1

   (a) 18

   (b) 5.56

   (c) 55.55

   (d) 100.

2. Value of one Faraday (1F) of electricity is approximately equal to : 1

   (a) 96200 C

   (b) 96500 C

   (c) 96000 C

   (d) 1.6×10^{-19} C.

3. $CuSo_4$ solution can not be stored in a vessel made up of : 1

(a) Zinc

(b) Glass

(c) Copper

(d) Plastic.

4. A strong electrolyte : 1

(a) Does not dissociate into ions.

(b) Dissociate into ions completely.

(c) Dissociate into ions but not completely.

(d) None of these.

5. Aliphatic and Aromatic primary amine when heated with chloroform ($CHCl_3$) and alcoholic solution of KOH, Isocyanide having unpleasant smell is formed. This reaction is known as : 1

(a) Carbylamine reaction.

(b) Stephen reaction.

(c) Sandmayer reaction.

(d) Swartz reaction.

6. Heaviest transition metal is : 1

(a) Fe

(b) Cu

(c) Cr

(d) Os.

7. $CH_3\ COO\ Ag + Br_2 \xrightarrow{CCl_4}$

The product of this reaction is : 1

(a) $CH_3CH_2Br + CO_2 + AgBr$

(b) $CH_3CH_2Cl + CO_2 + AgBr$

(c) $CH_3Cl + CO_2 + AgBr$

(d) $CH_3Br + CO_2 + AgBr$.

8. IUPAC name of $CH_3 - \overset{\overset{O}{\|}}{C} - CH_2CH_3$ is : 1

(a) Butane – 2 – al

(b) Butan– 2 – one

(c) Butane – 3 – one

(d) 2 – methyl propane – 1 – one.

9. The correct order of Increasing boiling point is : 1

(a) $CH_3CH_2CH_2CHO < CH_3CH_2CH_2CH_2CH_3 < CH_3CH_2CH_2CH_2OH < C_2H_5OC_2H_5$.

(b) $CH_3CH_2CH_2CH_2CH_3 < C_2H_5OC_2H_5 < CH_3CH_2CH_2CHO < CH_3CH_2CH_2CH_2OH$.

(c) $CH_3CH_2CH_2CH_2OH < C_2H_5OC_2H_5 < CH_3CH_2CH_2CHO < CH_3CH_2CH_2CH_2CH_3$.

(d) None of these.

10. Units of rate constant for a zero order reaction is : 1

(a) $mol\ L^{-1}S^{-1}$

(b) S^{-1}

(c) $L\ mol^{-1}\ S^{-1}$

(d) $L^2\ mol^{-2}\ S^{-1}$.

11. Assertion (A) : Acetic acid but not formic acid can be halogenated in the presence of Red P and Cl_2.

Reason (R) : Acetic acid is a weaker acid than formic acid.

(a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).

(b) Both Assertion (A) and Reason (R) are true but Reason (R) is not correct explanation of Assertion (A).

(c) Assertion (A) is true but Reason (R) is false.

(d) Assertion (A) is false but Reason (R) is true. 1

12. Assertion (A) : Alcohols have high boiling point than hydrocarbons of comparable molecular mass.

Reason (R) : Alcohols form inter molecular hydrogen bond between their molecules.

(a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).

(b) Both Assertion (A) and Reason (R) are true but Reason (R) is not correct explanation of Assertion (A).

(c) Assertion (A) is true but Reason (R) is false.

(d) Assertion (A) is false but Reason (R) is true. 1

SECTION–B

(Very Short Answer Type Questions)

13. Calculate E_{cell} for given cell if $E^{o}_{cell} = 3.17V$

$Mg \mid Mg^{2+}\ (0.130\ M) \mid \mid Ag^{+}\ (0.0001\ M) \mid Ag$

Given : $\log_{13} = 1.1139$. 2

14. (a) What is half-life period of a reaction? 1

(b) What is Pseudo-chemical reaction? 1

15. (a) Write IUPAC name of $\left[Co(NH_3)_6\right]Cl_3$. 1

(b) What is Didentate ligand? 1

16. Write the following :

(a) Reimer – Tiemann Reaction. 1

(b) IUPAC name of Isopropyl alcohol.

Or

Why phenols are more acidic than alcohols? 2

17. (a) Convert ethanol into ethyl alcohol (ethanol). 1

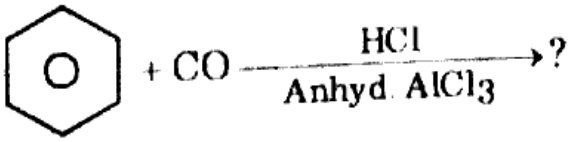
(b) Complete the reaction : 1

$$CH_3 - \underset{\underset{H}{|}}{C} = O + 4[H] \xrightarrow[HCl]{Zn/Hg} ?$$

18. (a) Complete the reaction : 1

$$CH_3 - \underset{\underset{Cl}{|}}{C} = O + H_2 \xrightarrow[Quinoline]{Pd/BaSO_4} ?$$

(b) Complete the reaction : 1



19. (a) Name the Sweetest form of natural sugar. 1

(b) Deficiency of which Vitamin causes the disease called beri-beri ? 1

SECTION–C

(Short Answer Type Questions)

20. (a) Explain geometry and magentic behavior of $[CoF_6]^{3-}$, on the basis of valence Bond theory (VBT). 2

(b) Deficiency of which metal causes low haemoglobin? 1

21. (a) Write four differences between Electrochemical cell and Electrolytic cell. 2

(b) What is the role of Pt-foil in S.H.E ? 1

Or

(a) How much charge is required for the reduction of 1 mole of Al^{3+} to Al ? 2

(b) Give the units of resistivity. 1

22. (a) A first order reaction is found to have a rate constant, $k = 5.5 \times 10^{-14} sec^{-1}$. Find the half life of the reaction. 2

(b) A reaction is found to be zero order will its molecularity be zero? 1

23. (a) Give dehydrogenation reaction of Primary and Secondary alcohol with Copper at 573K 2

(b) Write Kolbe's reaction. 1

24. (a) What are Carbohydrates? What are their important functions? 2

(b) What is denaturation of protein? 1

SECTION–D

(Case Study Question)

25. Context : The polarity of C-X bond of alkyl halide is responsible for their nucleophilic substitution, elimination and their reaction with metal atom to form organometallic compunds. Alkyl halides are prepared by the free-radical halogenation of alkanes, addition of halogen acids to alkenes, replacement of OH group of alcholos with halogens using phosphorous halides, thionyl chloride or halogen acids. Aryl halides are prepared by electrophilic substitution of arenes. Nucleophilic substitution reactions are categorised into SN^1 and SN^2 on the basis of their Kinetic properties.

Answer following questions .

(a) What happens when bromobenzene is treated with Mg in the presence of dry ether? Also write chemical reaction. 2

(b) Write the Chemical reaction for the preparation of 1-Iodobutane from : 2

(i) 1-chlorobutane (ii) but-1-ene.

SECTION–E

(Long Answer Type Questions)

26. (a) Why aliphaticamines are more basic than ammonia? 2

(b) Complete the reaction : 1,1

(i) $C_2H_5NH_2 + C_6H_5COCl \xrightarrow{NaOH(aq)}$

(ii) $CH_3CONH_2 + Br_2 + 4\,KOH \longrightarrow$

(c) What happens when ethylamine react with grignard reagent (CH_3 Mg Br)? 1

Or

(a) Convert :

(i) Aniline into benzene. 1

(ii) Aniline into benzendiazonium culoride. 1

(iii) Ethanoic acid into methanamine. 1

(b) Identify A, B and C 2

$$CH_3NH_2 + HONO \longrightarrow A \xrightarrow{P/I_2} B \xrightarrow{KCN} C$$

27. (a) Calculate the mole fraction of Ethylene glycol ($C_2H_6O_2$) in an aqueous solution containing 20% of Ehtylene glycol by mass. 2

(b) State and explain Raoults law for solutions containing volatile-solute and solutions containing non-volatile-solute. 2

(c) Why depression in freezing point temperature is a colligative property? 1

28. (a) Why transition metals show variable oxidation states? 1

(b) Why Zn^{2+} salts are white while Cu^{2+} salts are blue? 1

(c) Name the coinage metals? 1

(d) Draw the structure of Manganate ion $\left(Mn\ O_4^{2-}\right)$. 1

(e) Why transition metals act as good catalysts? 1