DAY — 06 SEAT NUMBER | | | | | | |

2021	IX	24	1030	J-565	(E)

CHEMISTRY (55)

Time : 3 Hrs. (7 Pages) Max. Marks : 70

General Instructions :

*The question paper is divided into **four** sections.*

(1) ***Section A :*** *Q. No. **1** contains **Ten** multiple choice type of questions carrying **One** mark each.*

*Q. No. **2** contains **Eight** very short answer type of questions carrying **One** mark each.*

(2) ***Section B :*** *Q. No. **3** to Q. No. **14** are **Twelve** short answer type of questions carrying **Two** marks each. (Attempt **any Eight**)*

(3) ***Section C :*** *Q. No. **15** to Q. No. **26** are **Twelve** short answer type of questions carrying **Three** marks each.(Attempt **any Eight**)*

(4) ***Section D :*** *Q. No. **27** to Q. No. **31** are **Five** long answer type of questions carrying **Four** marks each.(Attempt **any Three**)*

(5) *Use of log table is allowed. Use of calculator is not allowed.*

(6) *Figures to the right indicate full marks.*

(7) *For each multiple choice type of question, it is mandatory to write the correct answer along with its alphabet e.g. (a)...../ (b) ..... / (c) ..... / (d) .....etc.*

No mark (s) shall be given, if ONLY the correct answer or the alphabet of the correct answer is written.

Only the first attempt will be considered for evaluation

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SECTION - A

Q. 1. Select and write the correct answer for the following multiple choice type of questions : [10]

(i) The product obtained in the following reaction

$CH_3 - CH = CH - CH_2 - CHO \xrightarrow{H_2/Ni} ?$ is,

(a) Pent–3–en–1–ol (b) Pentan–1–ol

(c) Pentan–2–ol (d) Pentanal

(ii) Amongst the following, the solubility of which ionic solid decreases with increase in temperature?

(a) KNO_3 (b) NaBr

(c) Na_2SO_4 (d) KCl

(iii) The correct IUPAC name of $Na_3[AlF_6]$ is

(a) Sodium hexafluoroaluminate (III)

(b) Sodium hexafluoroaluminate (II)

(c) Sodium hexafluoroaluminium (III)

(d) Sodium hexafluoroaluminium (II)

(iv) Which of the following acids has highest pKa value?

(a) Mono chloroacetic acid (b) Dichloroacetic acid

(c) Trichloroacetic acid (d) Acetic acid

(v) Number of carbon atoms present in isoprene unit is ____.

(a) 6 (b) 5

(c) 4 (d) 3

(vi) The colourless transition metal ion amongst the following is _____.

(a) Cu^+ (b) Cu^{++}

(c) Ni^{++} (d) Co^{++}

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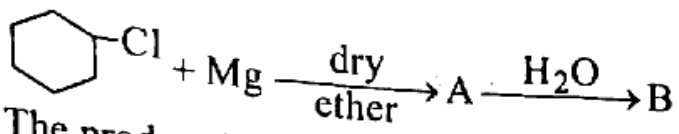
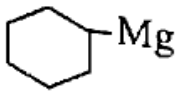
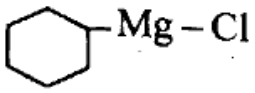
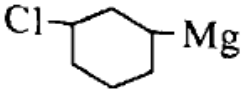
(vii) 

The product 'B' in the above reaction sequence is

(a) 

(b) 

(c) 

(d)

(viii) Carbylamine test is given by

(a) aniline

(b) dimethylamine

(c) trimethylamine

(d) both dimethylamine and trimethylamine

(ix) A weak monobasic acid is 0.05% dissociated in 0.02 M solution, dissociation constant of the acid is _____.

(a) 5×10^{-10}

(b) 5×10^{-9}

(c) 50×10^{-9}

(d) 0.5×10^{-9}

(x) The rate constant for the reaction $2N_2O_{5(g)} \rightarrow 2N_2O_{4(g)} + O_{2(g)}$ is 4.98×10^{-4} s^{-1}. The order of reaction is _____.

(a) 0

(b) 1

(c) 2

(d) 3

Q. 2. Answer the following questions : **[8]**

(i) Write the name of interhalogen compound of chlorine which has square pyramidal structure.

(ii) Write the name of sugar present in RNA.

(iii) Write the value of $\frac{2.303\,RT}{F}$ in Nernst equation.

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(iv) What is the coordination number of atoms in simple cubic crystal lattice?

(v) Write the name of nanostructural material used in tyres to increase their life.

(vi) Write the name of reagent used during conversion of acetaldehyde to acetaldehyde cyanohydrin.

(vii) Write the chemical formula of Haematite.

(viii) In a particular reaction, 2kJ of heat is released by the system and 6 kJ of work is done on the system. Calculate ΔU.

SECTION - B

Attempt any EIGHT of the following questions : **[16]**

Q. 3. What are bidentate Ligands? Give one example.

Q. 4. Draw the structure of sulphurous acid. Write two uses of helium.

Q. 5. The molar conductivity of 0.01M acetic acid at 25°C is $18\Omega^{-1}\ cm^2\ mol^{-1}$. Calculate its degree of dissociation in 0.01M solution and dissociation constant, if molar conductivity of acetic acid at zero concentration is $400\Omega^{-1}\ cm^2\ mol^{-1}$.

Q. 6. Write classification of proteins on the basis of molecular shapes with example.

Q. 7. What is pseudo-first order reaction? Explain with suitable example.

Q. 8. What is the molar mass of a solute if a solution prepared by dissolving 0.822 g of it in 0.3 dm^3 of water has an osmotic pressure of 0.196 atm. at 298 K ?

Q. 9. Write a note on Kolbe reaction.

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Q. 10. Iron exhibits +2 and +3 oxidation states. Write their electronic configuration. Which will be more stable? Why?

Q. 11. How is benzophenone prepared from benzonitrile?

Q. 12. Write names and structure of monomers used in the preparation of Nylon 6, 6 polymer.

Q. 13. Derive the relationship between pH and pOH.

Q. 14. What is action of the following on chlorobenzene?

(i) Methyl chloride in presence of anhydrous $AlCl_3$

(ii) Fuming H_2SO_4

SECTION - C

Attempt any EIGHT of the following questions : **[24]**

Q. 15. Calculate the standard enthalpy of

$$N_2H_{4(g)} + H_{2(g)} \rightarrow 2NH_{3(g)}$$

if $\Delta H^\circ(N-H) = 389\ kJ\ mol^{-1}$

$\Delta H^\circ(H-H) = 435\ kJ\ mol^{-1}$

$\Delta H^\circ(N-N) = 159\ kJ\ mol^{-1}$

Q. 16. Write reactions to prepare ethanamine from

(i) acetonitrile

(ii) nitroethane

(iii) propionamide

Q. 17. Explain three principles of green chemistry.

Q. 18. Write chemical equations involved during manufacture of sulphuric acid by contact process.

Write two uses of sulphur dioxide.

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Q. 19. Explain SN^2 reaction mechanism for alkaline hydrolysis of bromomethane.

Q. 20. Why $La(OH)_3$ is the strongest base, while $Lu(OH)_3$ is the weakest base? Write two applications of catalytic properties of transition metals and compounds.

Q. 21. Convert the following :

(i) chlorobenzene to phenol

(ii) ethanal to ethanol

(iii) iodomethane to methoxy methane

Q. 22. Define Cryoscopic constant.

Derive the relation between elevation of boiling point and molar mass of solute.

Q. 23. Define solubility product.

Derive the relationship between solubility and solubility product for PbI_2.

Q. 24. A compound forms hexagonal close packed (hcp) structure. What is the number of

(i) octahedral voids

(ii) tetrahedral voids

(iii) total voids formed in 0.4 mol of it?

Q. 25. Illustrate with example, the difference between a double salt and coordinate compounds.

Write two applications of coordinate compounds.

Q. 26. Write a note on 'aldol' condensation reaction of ethanal.

Write chemical reaction involved when benzaldehyde is treated with concentrated caustic potash.

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SECTION - D

Attempt any THREE of the following questions : **[12]**

Q. 27. Define isomorphism. Derive integrated rate law expression for first order reaction.

Q. 28. What is the action of concentrated H_2SO_4 on,

(i) CaF_2

(ii) Cane sugar

What is nucleotide? Write reaction for the preparation of polyacrylonitrile (PAN).

Q. 29. State Kohlrausch law of independent migration of ions.

Write and explain two applications of electrochemical series.

Write unit of cell constant.

Q. 30. Define :

(i) Intensive property

(ii) Enthalpy of sublimation

2 moles of an ideal gas are expanded isothermally and reversibly from 20L to 30L at 300K :

Calculate the work done.

[$R = 8.314\ JK^{-1}\ mol^{-1}$]

Q. 31. Define mineral.

Write IUPAC name of [$Fe(CO)_5$] complex.

How will you convert

(i) methyl iodide to methyl isocyanide.

(ii) methyl cyanide to ethanoic acid.

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