DAY —— 08 SEAT NUMBER

2022	III	12	1030	J-752	(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.

SECTION - A

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

(i) The co-ordination number of atoms in body centred cubic structure (bcc) is _____.

(a) 4 (b) 6

(c) 8 (d) 12

(ii) In calculating osmotic pressure, the concentration of solute is expressed in _____.

(a) molarity (b) molality

(c) mole fraction (d) percentage mass

(iii) The enthalpy change for the chemical reaction $H_2O_{(s)} \rightarrow H_2O_{(l)}$ is called enthalpy of _____.

(a) vapourisation (b) fusion

(c) combustion (d) sublimation

(iv) Which of the following transition element shows maximum oxidation state?

(a) Sc (b) Fe

(c) Mn (d) V

(v) The correct formula for the complex compound, sodium hexacyanoferrate (III) is _____.

(a) $Na\,[Fe(CN)_6]$ (b) $Na_2\,[Fe(CN)_6]$

(c) $Na_3\,[Fe(CN)_6]$ (d) $Na_4\,[Fe(CN)_6]$

(vi) Isopropylbenzene on air oxidation followed by decomposition by dilute acid gives _____.

(a) C_6H_5OH (b) $C_6H_5COOCH_3$

(c) C_6H_5COOH (d) C_6H_5CHO

(vii) The name of metal nanoparticle which acts as highly effective bacterial disinfectant in water purification process is _____.

(a) carbon black (b) silver

(c) gold (d) copper

(viii) Acid anhydride on reaction with primary amine gives compound having a functional group _____.

(a) amide (b) nitrile

(c) secondary amine (d) imine

(ix) The standard potential of the cell in the following reaction is _____.

$$Cd_{(s)} + Cu^{2+}_{(1M)} \longrightarrow Cd^{2+}_{(1M)} + Cu_{(s)}$$

$(E^{\circ}_{Cd} = -0.403V, E^{\circ}_{Cu} = 0.334V)$

(a) -0.737 V (b) 0.737 V

(c) -0.069 V (d) 0.069 V

(x) The value of $[H_3O^+]$ in mol lit^{-1} of 0.001 M acetic acid solution (Ka = 1.8×10^{-5}) is _____.

(a) 1.34×10^{-1} (b) 1.34×10^{-2}

(c) 1.34×10^{-3} (d) 1.34×10^{-4}

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

(i) Write the product formed when alkyl halide reacts with silver nitrite.

(ii) Write the name of product formed, when acetone is treated with 2, 4-dinitrophenyl hydrazine.

(iii) Write the name of biodegradable polyamide copolymer.

(iv) Identify the molecularity of following elementary reaction :

$$NO_{(g)} + O_{3(g)} \longrightarrow NO_{3(g)} + O_{(g)}$$

(v) What is the action of selenium on magnesium metal?

(vi) Write the name of isomerism in the following complexes : $[Cu(NH_3)_4][PtCl_4]$ and $[Pt(NH_3)_4][CuCl_4]$

(vii) Write the name of the alloy used in Fischer Tropsch process in the synthesis of gasoline.

(viii) Henry's law constant for $CH_3Br_{(g)}$ is 0.159 mol dm^{-3} bar^{-1} at 25°C. What is solubility of $CH_3Br_{(g)}$ in water at same temperature and partial pressure of 0.164 bar?

SECTION - B

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

Q. 3. Explain pseudo-first order reaction with suitable example.

Q. 4. Write the consequences of Schottky defect with reasons.

Q. 5. What is the action of following on ethyl bromide :
(i) Na in dry ether
(ii) Mg in dry ether

Q. 6. Explain formation of peptide linkage in protein with an example.

Q. 7. Derive an expression to calculate molar mass of non volatile solute by osmotic pressure measurement.

Q. 8. Explain monodentate and ambidentate ligands with example.

Q. 9. Explain the trends in the following atomic properties of group 16 elements :
(i) Atomic radii
(ii) Ionisation enthalpy
(iii) Electronegativity
(iv) Electron gain enthalpy

Q. 10. Write preparation of phenol from aniline.

Q. 11. Write chemical reactions to prepare ethanamine from :

(i) acetonitrile

(ii) nitroethane

Q. 12. Identify A and B from the following reaction :

$$2\,CH_3-\underset{\displaystyle CH_3}{\overset{|}{C}}=O \xrightarrow{Ba(OH)_2} A \xrightarrow{\Delta} B + H_2O$$

Q. 13. One mole of an ideal gas is expanded isothermally and reversibly from 10 L to 15 L at 300 K. Calculate the work done in the process.

Q. 14. How many moles of electrons are required for reduction of 2 moles of Zn^{2+} to Zn? How many Faradays of electricity will be required?

SECTION - C

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

Q. 15. Write chemical composition of haematite. Write the names and electronic configurations of first two elements of group 17.

Q. 16. Write classification of polymers on the basis of structure.

Q. 17. Define green chemistry. Write two disadvantages of nanotechnology.

Q. 18. Write commercial method for preparation of glucose. Write structure of adipic acid.

Q. 19. Write chemical reactions of following reagents on methoxyethane:

(i) hot HI

(ii) PCl_5

(ii) dilute H_2SO_4

Q. 20. Explain cationic, anionic and neutral sphere complexes with example.

Q. 21. Calculate spin only magnetic moment of divalent cation of transition metal with atomic number 25.

Salts of Ti^{4+} are colourless. Give reason.

Q. 22. What is lanthanoid contraction?

Write preparation of acetic acid from

(i) dry ice

(ii) acetyl chloride.

Q. 23. Write the classification of aliphatic ketones with example. What is the action of sodium hypoiodite on acetone?

Q. 24. Define half life of first order reaction. Obtain the expression for half life and rate constant of the first order reaction.

Q. 25. Calculate the standard enthalpy of formation of $CH_3OH_{(l)}$ from the following data

(i) $CH_3OH_{(l)} + \frac{3}{2}O_{2(g)} \rightarrow CO_{2(g)} + 2H_2O_{(l)}$

$\Delta H^\circ = -726\,kJ\ mol^{-1}$

(ii) $C_{(s)} + O_{2(g)} \rightarrow CO_{2(g)}$ $\Delta_c H^\circ = -393\ kJ\ mol^{-1}$

(iii) $H_{2(g)} + \frac{1}{2}O_{2(g)} \rightarrow H_2O_{(l)}$ $\Delta_f H^\circ = -286\ kJ\ mol^{-1}$

Q. 26. Calculate the pH of buffer solution composed of 0.01 M weak base BOH and 0.02M of its salt BA.

[$K_b = 1.8 \times 10^{-5}$ for weak base]

SECTION - D

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

Q. 27. Define the following terms :

(i) Isotonic solution

(ii) Osmosis

Gold crystallises into face-centred cubic cells. The edge length of unit cell is 4.08×10^{-8} cm. Calculate the density of gold.

[Molar mass of gold = 197 g mol^{-1}]

Q. 28. Write the mathematical equation for the first law of thermodynamics for

(i) isothermal process

(ii) adiabatic process

Derive the relationship between pH and pOH.

Q. 29. Define reference electrode. Write functions of salt bridge.

Draw neat, labelled diagram of standard hydrogen electrode (SHE).

Q. 30. Explain metal deficiency defect with example. Write chemical equation for preparation of sulphur dioxide from sulphur. Write uses of sulphur.

Q. 31. Write chemical reactions for the following conversions :

(i) Ethyl bromide to ethyl methyl ether.

(ii) Ethyl bromide to ethene.

(iii) Bromobenzene to toluene.

(iv) Chlorobenzene to biphenyl.

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DAY ——— **OS** SEAT NUMBER

2023	III	01	1100	J-252	(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.

Given :

$R = 8.314\ J.K^{-1}.mol^{-1}$

$N_A = 6.022 \times 10^{23}$

$F = 96500C$

SECTION - A

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

(i) The relation between radius of sphere and edge length in body centered cubic lattice is given by formula :

(a) $\sqrt{3}r = 4a$ (b) $r = \frac{\sqrt{3}}{a} \times 4$

(c) $r = \frac{\sqrt{3}}{4}a$ (d) $r = \frac{\sqrt{2}}{4} \times a$

(ii) The pH of weak monoacidic base is 11.2, its OH^- ion concentration is :

(a) 1.585×10^{-3} mol dm^{-3} (b) 3.010×10^{-11} mol dm^{-3}

(c) 3.010×10^{-3} mol dm^{-3} (d) 1.585×10^{-11} mol dm^{-3}

(iii) Which of the following correctly represents integrated rate law equation for a first order reaction in gas phase :

(a) $k = \frac{2.303}{t} \times \log_{10} \frac{Pi}{Pi - P}$ (b) $k = \frac{2.303}{t} \times \log_{10} \frac{Pi}{2Pi - P}$

(c) $k = \frac{2.303}{t} \times \log_{10} \frac{2Pi}{Pi - P}$ (d) $k = \frac{2.303}{t} \times \log_{10} \frac{Pi - P}{2Pi}$

(iv) The spin only magnetic moment of Mn^{2+} ion is _____ .

(a) 4.901 BM (b) 5.916 BM

(c) 3.873 BM (d) 2.846 BM

(v) The correct formula of a complex having IUPAC name Tetraamminedibromoplatinum (IV) bromide is _____.

(a) $[Pt\,Br\,(NH_3)_4]\,Br_2$ (b) $[Pt\,Br_2\,(NH_3)_4]\,Br$

(c) $[Pt\,Br_2\,(NH_3)_4]\,Br_2$ (d) $[Pt\,Br\,(NH_3)_4]\,Br$

(vi) The allylic halide, among the following is _____.

(a) $R-\underset{\underset{X}{|}}{CH}-R$ (b) $CH_2=CH-X$

(c)  (d) $CH_2=CH-CH_2-X$

(vii) The product of following reaction is

$$CH_3-CH=CH-CH_2-CHO \xrightarrow[ii)\,H_3O^+]{i)\,LiAlH_4} \_\_\_\_\_?$$

(a) $CH_3-CH_2-CH_2-CH_2-CH_2-OH$

(b) $CH_3-CH=CH-CH_2-CH_2-OH$

(c) $CH_3-CH_2-CH_2-CH_2-COOH$

(d) $CH_3-CH=CH-CH_2-COOH$

(viii) Ozonolysis of 2, 3 dimethyl but-2-ene, followed by decomposition by Zn dust and water gives _____.

(a) acetaldehyde

(b) propionaldehyde and acetone

(c) acetone

(d) acetaldehyde and butyraldehyde

(ix) The glycosidic linkage present in maltose is _____.

(a) $\alpha, \beta - 1,2$ - glycosidic linkage

(b) $\alpha - 1,4$ - glycosidic linkage

(c) $\beta - 1,4$ - glycosidic linkage

(d) $\alpha - 1,6$ - glycosidic linkage

(x) The monomer of natural rubber is _____.

(a) Isoprene (b) Acrylonitrile

(c) ε-Caprolactam (d) Tetrafluoroethylene

P.T.O.

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

(i) Write the name of the technique used to know geometry of nanoparticles.

(ii) Write the name of the product formed by the action of $LiAlH_4$ / ether on acetamide.

(iii) Write the structure of the product formed when chlorobenzene is treated with sodium metal in the presence of dry ether.

(iv) Write the chemical composition of cryolite.

(v) Write the name of platinum complex used in the treatment of cancer.

(vi) Write the SI unit of cryoscopic constant.

(vii) Write the correct condition for spontaneity in terms of Gibbs energy.

(viii) Calculate molar conductivity for 0.5 M $BaCl_2$ if its conductivity at 298K is 0.01 $\Omega^{-1}cm^{-1}$.

SECTION - B

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

Q. 3. Distinguish between lanthanides and actinides.

Q. 4. Calculate the mole fraction of solute, if the vapour pressure of pure benzene at certain temperature is 640 mmHg and vapour pressure of solution of a solute in benzene is 600 mmHg.

Q. 5. Define : Green chemistry. Write two advantages of nanoparticle and nanotechnology.

Q. 6. Explain the following terms :

(a) Substitutional impurity defect

(b) Interstitial impurity defect

Q. 7. Write the chemical reactions for the following:

(a) Chlorobenzene is heated with fuming H_2SO_4

(b) Ethyl bromide is heated with silver acetate

Q. 8. Define : Acidic buffer solution. Write the relationship between solubility and solubility product for PbI_2.

Q. 9. What is the action of the following reagents on ethyl amine

(a) Chloroform and caustic potash

(b) Nitrous acid

Q. 10. Calculate standard Gibbs energy change at 25°C for the cell reaction

$$Cd(s) + Sn^{2\oplus}(aq) \longrightarrow Cd^{2\oplus}(aq) + Sn(s)$$

$E^{\circ}_{Cd} = -0.403V, E^{\circ}_{Sn} = -0.136V$

Q. 11. Write chemical reaction for the preparation of glucose from sucrose. Write structure of D-ribose.

Q. 12. Define Extensive property. Calculate the work done during the expansion of 2 moles of an ideal gas from 10 dm^3 to 20 dm^3 at 298 K in vacuum.

Q. 13. Write the reactions for the formation of nylon 6,6 polymer.

Q. 14. Draw structures of the following compounds:

(a) chloric acid

(b) peroxy disulphuric acid

SECTION - C

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

Q. 15. *Define Osmosis.*

How will you determine molar mass of non volatile solute by elevation of boiling point?

Q. 16. Convert the following :

(i) Ethyl alcohol into ethyl acetate

(ii) Phenol into benzene

(iii) Diethyl ether into ethyl chloride

Q. 17. A weak monobasic acid is 10% dissociated in 0.05 M solution. What is percent dissociation in 0.15 M solution?

Q. 18. Explain dehydrohalogenation reaction of 2-chlorobutane. Write use and environmental effect of CFC.

Q. 19. 2000 mmol of an ideal gas expanded isothermally and reversibly from 20 L to 30 L at 300 K, calculate the work done in the process ($R = 8.314\ JK^{-1}\ mol^{-1}$). $W = -P_{ext}\Delta V$

Q. 20. What are interstitial compounds? Give the classification of alloys with examples.

Q. 21. Draw labelled diagram of $H_2 - O_2$ fuel cell. Write two applications of fuel cell.

Q. 22. Explain formation of $[CoF_6]^{3\ominus}$ complex with respect to

(i) Hybridisation

(ii) Magnetic properties

(iii) Inner / outer complex

(iv) Geometry

Q. 23. What is Pseudo first order reaction? Derive integrated rate law equation for zero order reaction.

Q. 24. Explain Aldol condensation of ethanal.

Q. 25. Explain anomalous behaviour of oxygen in group 16 with respect to :

(i) Atomicity

(ii) Magnetic property

(iii) Oxidation state

Q. 26. Write chemical reactions for the following conversions :

(a) Acetic acid into acetic anhydride

(b) Acetic acid into ethyl alcohol

Write IUPAC name and structure of methylphenylamine.

SECTION - D

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

Q. 27. Show that, time required for 99.9% completion of a first order reaction is three times the time required for 90% completion.

Give electronic configuration of Gd (Z =64). Write the name of nano structured material used in car tyres to increase the life of tyres.

Q. 28. Derive relationship between ΔH and ΔU for gaseous reaction.

Define : Vulcanization

What is peptide bond?

Q. 29. Silver crystallizes in fcc structure. If edge length of unit cell is 400 pm, calculate density of silver (Atomic mass of Ag = 108).

Write a note on Haloform reaction.

Q. 30. Define : Distereoisomers.

Give cis and trans isomers of $[Co(NH_3)_4Cl_2]^{\oplus}$.

What is reference electrode?

Give reason : Bleaching action of ozone is also called dry bleach.

Q. 31. Write Dow process for preparation of Phenol. What is the action of bromine water on phenol?

Give reason: Group 16th elements have lower ionisation enthalpy compared to group 15th elements.

Write two uses of dioxygen.

DAY —— 08 SEAT NUMBER

2024	II	29	1100	J-852	(E)

CHEMISTRY (55)

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

General Instructions :

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*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) Given : $R = 8.314\ J.K^{-1}.mol^{-1}$

$N_A = 6.022 \times 10^{23}$

$F = 96500C$

SECTION - A

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

(i) The spin only magnetic moment of Cr^{3+} cation is _____.

(a) 3.742 BM (b) 3.755 BM

(c) 3.873 BM (d) 3.633 BM

(ii) The linkage present in Lactose is _____.

(a) $\alpha, \beta -1, 2 -$ glycosidic linkage

(b) $\alpha -1, 4 -$ glycosidic linkage

(c) $\beta -1, 4 -$ glycosidic linkage

(d) $\alpha -1, 4 -$ glycosidic linkage

(iii) The product of the following reaction is

$$C_2H_5-\overset{\overset{O}{\|}}{C}-CH_3 \xrightarrow[\Delta]{H_2/Ni} ?$$

(a) $CH_3-CH_2-CH_2-CH_2-OH$

(b) $CH_3-\underset{\underset{OH}{|}}{CH}-CH_2-CH_3$

(c) $CH_3-CH_2-CH_2-CH_3$

(d) $CH_3-CH_2-CH_2-COOH$

(iv) The pH of 0.001M HCl solution is _____.

(a) 10 (b) 3

(c) 2 (d) 11

(v) The correct structure of complex having IUPAC name sodium hexanitrocobaltate (III) is

(a) $Na_3[Co(NO_2)_5]$

(b) $Na_4[Co(NO_2)_6]$

(c) $Na_3[Co(NO_2)_6]$

(d) $Na_4[Co(NO_2)_5]$

(vi) The number of particles present in Face Centred Cubic Unit Cell is/are _____.

(a) 1 (b) 2

(c) 3 (d) 4

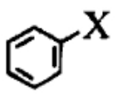
(vii) The monomer used in preparation of teflon is _____.

(a) E caprolactum (b) vinyl chloride

(c) styrene (d) tetrafluoroethene

(viii) Among the following vinylic halide is _____.

(a) $R-\underset{\displaystyle X}{\underset{|}{CH}}-R$ (b) $CH_2=CH-X$

(c)  (d) $CH_2=CH-CH_2-X$

(ix) The product of hydrolysis of propyne in the presence of 1% H_gSO_4 and 40% H_2SO_4 is _____.

(a) methanal (b) ethanal

(c) propanal (d) propanone

(x) If unit of rate constant is mol $dm^{-3}s^{-1}$, the order of reaction would be _____.

(a) zero (b) 1

(c) 2 (d) 3

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

(i) Write the name of metal nanoparticle used to remove E.coli bacteria from water.

(ii) Write the name of reduction product formed when ethyl cyanide is treated with sodium and alcohol.

(iii) Complete the reaction: $CH_3CH_2Cl \xrightarrow[alc.\Delta]{AgCN} ?$

(iv) Calculate effective atomic number of $[Co(NH_3)_6]^{3+}$ ion.

(v) The compounds of Ti^{4+} ions are colourless due to .....

(vi) Write SI unit of molar conductivity.

(vii) Write the sign convention of work done during expansion of gas.

(viii) Write the condition of reverse osmosis.

SECTION - B

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

Q. 3. Derive an expression for maximum work obtainable during isothermal reversible expansion of an ideal gas from initial volume (V_1) to final volume (V_2).

Q. 4. What are interhalogen compounds? Write the chemical reaction, when chlorine reacts with dry slaked lime.

Q. 5. What is nano material? Write the reaction involved in sol-gel process during hydrolysis.

Q. 6. Write classification of proteins with an example.

Q. 7. Calculate the time required to deposit 2·4 g of Cu, when 2·03 A of current passed through $CuSO_4$ solution.
(At. mass of Cu = 63.5 $g.mol^{-1}$)

Q. 8. Why amines are basic in nature? Among dimethylamine (pK_b = 3·27) and diethylamine (pK_b = 3·0), which one is more basic?

Q. 9. Explain buffer action of sodium acetate-acetic acid buffer.

Q. 10. Write preparation of (a) diethyl ether (b) ethyl cyanide from ethyl bromide.

Q. 11. Henry's constant for $CH_3Br_{(g)}$ is 0·159 mol $dm^{-3}.bar^{-1}$ at 25°C. Calculate its solubility in water at 25°C, if its partial pressure is 0·164 bar.

Q. 12. Write the structure and name of monomer of

(a) Nylon-6

(b) Natural rubber

Q. 13. Define Lanthanide contraction. Write the balanced chemical equations when acidified $K_2Cr_2O_7$ reacts with H_2S.

Q. 14. Derive the relationship between molar mass, density of the substance and unit cell edge length.

SECTION - C

Attempt any EIGHT of the following questions : [24]

Q. 15. What is osmotic pressure? How will you determine molar mass of solute from osmotic pressure?

Q. 16. Write chemical reactions involved in :

(a) Rosenmund reduction.

(b) Gatterman Koch formylation.

(c) Cannizzaro reaction of methanal.

Q. 17. Calculate the standard enthalpy of combustion of methane, if the standard enthalpy of formation of methane, carbon dioxide and water are $-74{\cdot}8$, $-393{\cdot}5$ and $-285{\cdot}8$ $kJmol^{-1}$ respectively.

Q. 18. What is the action of following on ethyl bromide ?

(a) silver nitrite

(b) Mg in dry ether

(c) alcoholic sodium hydroxide

Q. 19. For the reaction $A + B \rightarrow P$.
If [B] is doubled at constant [A], the rate of reaction doubled. If [A] is triple and [B] is doubled, the rate of reaction increases by a factor of 6. Calculate the rate law equation.

Q. 20. Arrange the following in the increasing order of the property mentioned:

(i) $HOCl$, $HClO_2$, $HClO_3$, $HClO_4$ (acidic strength)

(ii) MF, MCl, MBr, MI (ionic character)

(iii) HF, HCl, HBr, HI (thermal stability)

Q. 21. Explain Wolf-Kishner reduction reaction. Write preparation of propanone by using ethanoyl chloride and dimethyl cadmium.

Q. 22. Write postulates of Werner theory of co-ordination complexes. Write the name of a hexadentate ligand.

Q. 23. Define electrochemical series and write its two applications.

Q. 24. Identify 'A', 'B' and 'C' in following chain reaction and rewrite the chemical reactions:

$$CH_3CH_2OH \xrightarrow[Br_2]{red\ 'P'} A \xrightarrow[alc]{KCN} B \xrightarrow[Ether]{LiAlH_4} C$$

Q. 25. Define acids and bases according to Bronsted-Lowry theory. Derive relationship between pH and pOH.

Q. 26. Write the preparation of potassium dichromate from chromite ore.

SECTION - D

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

Q. 27. Convert the following :

(i) acetaldehyde to isopropyl alcohol.

(ii) cumene to phenol.

(iii) anisole to phenol.

Write two uses of neon.

Q. 28. Define : (i) Extensive and Intensive properties

(ii) Isobaric and Adiabatic processes

What are enzymes?

Write the atomic numbers of transuranium elements.

Q. 29. Predict the type of cubic lattice of a solid element having edge length of 400 pm and density is 6·25 g/ml
(Atomic mass of element = 60)
Define : Nanoscience
Write chemical reaction for the preparation of polyacrylonitrile.

Q. 30. Derive the relation between half life period and rate constant for first order reaction.

Write the net cell reaction during discharging of lead accumulator.

Draw the structure of peroxymonosulphuric acid.

Q. 31. Mention the number of unpaired electrons and geometry of following complexes :

(i) $[Ni(Cl)_4]^{2-}$

(ii) $[Ni(CN)_4]^{2-}$

Convert the following :

(a) Ethanenitrile into ethanal.

(b) Cyclohexane into adipic acid.