

CHEMISTRY

Time : 3 Hours]

[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 coordination number of atoms in body-centred cubic structure (bcc) is

- (a) 4 (b) 6 (c) 8 (d) 12 (1)

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

- | | |
|-------------------|--------------------------------------|
| (a) molarity | (b) molality |
| (c) mole fraction | (d) percentage mass (1) |

- (iii) The enthalpy change for the reaction, $H_2O_{(l)} \rightarrow H_2O_{(g)}$ is called enthalpy of
 (a) vaporisation (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
 $Cd_{(s)} + Cu^{2+}_{(1M)} \rightarrow Cd^{2+}_{(1M)} + Cu_{(s)}$
 $(E^0_{Cd} = -0.403 \text{ V}, E^0_{Cu} = 0.334 \text{ V})$
 (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 0.001M acetic acid solution ($K_a = 1.8 \times 10^{-5}$) 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 :

- (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 :
 $NO_{(g)} + O_{3(g)} \rightarrow NO_{3(g)} + O_{(g)}$

- (v) What is the action of selenium on magnesium metal? (1)
- (vi) Write the name of isomerism in the following complexes : (1)
 $[\text{Cu}(\text{NH}_3)_4]\text{PtCl}_4$ and $[\text{Pt}(\text{NH}_3)_4]\text{CuCl}_4$.
- (vii) Write the name of the alloy used in Fischer Tropsch process in the synthesis of gasoline. (1)
- (viii) Henry's law constant for $\text{CH}_3\text{Br}_{(g)}$ is $0.159 \text{ mol dm}^{-3} \text{ bar}^{-1}$ at 25°C . What is solubility of $\text{CH}_3\text{Br}_{(g)}$ in water at same temperature and partial pressure of 0.164 bar ? (1)

SECTION-B

[16]

Attempt any EIGHT of the following questions :

- Q. 3. Explain pseudo-first order reaction with suitable example. (2)
- Q. 4. Write the consequences of Schottky defect with reasons. (2)
- Q. 5. What is the action of following on ethyl bromide : (2)
 (i) Na in dry ether
 (ii) Mg in dry ether?
- Q. 6. Explain formation of peptide linkage in protein with an example. (2)
- Q. 7. Derive an expression to calculate molar mass of non-volatile solute by osmotic pressure measurement. (2)
- Q. 8. Explain monodentate and ambidentate ligands with example. (2)
- Q. 9. Explain the trends in the following atomic properties of group 16 elements : (2)
 (i) Atomic radii
 (ii) Ionisation enthalpy
 (iii) Electronegativity
 (iv) Electron gain enthalpy.
- Q. 10. Write preparation of phenol from aniline. (2)
- Q. 11. Write chemical reactions to prepare ethanamine from : (2)
 (i) acetonitrile
 (ii) nitroethane.
- Q. 12. Identify A and B from the following reaction : (2)
- $$2\text{CH}_3-\overset{\text{CH}_3}{\underset{|}{\text{C}}}=\text{O} \xrightarrow{\text{Ba(OH)}_2} \text{A} \xrightarrow{\Delta} \text{B} + \text{H}_2\text{O}.$$
- 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. (2)
- 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? (2)

SECTION-C

Attempt any EIGHT of the following questions :

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

[2]

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

(3)

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

(3)

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

(3)

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

(i) hot HI

(ii) PCl_5

(iii) dilute H_2SO_4

(3)

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

(3)

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.

(3)

Q. 22. What is lanthanoid contraction?

Write preparation of acetic acid from

(i) dry ice

(ii) acetyl chloride.

(3)

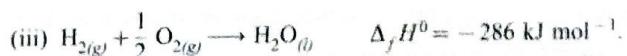
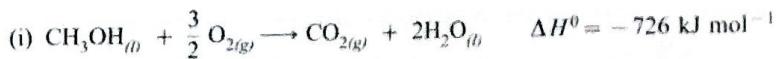
Q. 23. Write the classification of aliphatic ketones with example. What is the action of sodium hypojodite on acetone?

(3)

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

(3)

Q. 25. Calculate the standard enthalpy of formation of $\text{CH}_3\text{OH}_{(l)}$ from the following data



Q. 26. Calculate the pH of a buffer solution composed of 0.01M weak base BOH and 0.02M of its salt BA. $[\text{K}_b = 1.8 \times 10^{-5} \text{ for weak base}]$

(3)

SECTION-D

Attempt any THREE of the following questions :

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 $4.08 \times 10^{-8} \text{ cm}$. Calculate the density of gold.

[Molar mass of gold = 197 g mol⁻¹] (4)

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. (4)

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

Draw neat, labelled diagram of standard hydrogen electrode (SHE). (4)

Q. 30. Explain metal deficiency defect with example. Write chemical equation for preparation of sulphur dioxide from sulphur. Write uses of sulphur. (4)

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.

(4)

PRACTICE PAPER - I

[Max. Marks : 70]

Time : 3 Hours]

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) Which of the following information is given by FTIR technique?

(a) Absorption of functional groups (b) Particle size

(c) Confirmation of formation of nanoparticles (d) Crystal structures

(ii) The order of the reaction for which the units of rate constant are mol dm⁻³ s⁻¹ is

(a) 1 (b) 3 (c) 0 (d) 2

(iii) Blood in human body is highly buffered at pH of

(a) 7.4 (b) 7.0 (c) 6.9 (d) 8.1

- (iv) The sum of coordination number and oxidation number of M in $[M(en)_2C_2O_4]$ Cl is (1)
 (a) 6 (b) 7 (c) 9 (d) 8
- (v) Which of the following have d^0s^0 configuration? (1)
 (a) Sc^{3+} (b) Ti^{4+} (c) V^{5+} (d) All of the above
- (vi) Benzaldehyde does not show positive test with (1)
 (a) Schiff reagent (b) Tollen's reagent
 (c) Sodium bisulphite solution (d) Fehling solution
- (vii) The enthalpy of formation for all elements in their standard states is (1)
 (a) unity (b) zero (c) less than zero (d) different elements
- (viii) In calculating osmotic pressure, the concentration of solute is expressed in (1)
 (a) molarity (b) molality (c) mole fraction (d) mass per cent
- (ix) A single substance that exists in two or more forms is called (1)
 (a) polymorphous (b) amorphous
 (c) isomorphous (d) monomorphous
- (x) Which of the following compounds contains azo linkage? (1)
 (a) Hydrazine (b) *p*-Hydroxyazobenzene
 (c) N-Nitrosodiethylamine (d) Ethylenediamine

Q. 2. Answer the following questions :

[8]

- (i) Write the reaction of conc. H_2SO_4 with sugar. (1)
- (ii) What is the chemical name of DDT? (1)
- (iii) Explain : BF_3 is a Lewis acid. (1)
- (iv) Mention the solvent and solute in the following : Moisture. (1)
- (v) Name the four bases present in DNA which of these is not present in RNA. (1)
- (vi) Classify the following properties as intensive or extensive : (1)
 (i) Enthalpy (ii) Volume.
- (vii) Name a polymer used for making LCD screen. (1)
- (viii) In which block of the modern periodic table are the transition elements placed? (1)

SECTION-B

Attempt any EIGHT of the following questions :

[16]

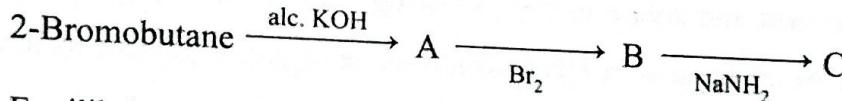
- Q. 3. Give reasons : The disaccharide sucrose gives negative Tollens test while the disaccharide maltose gives positive Tollen's test. (2)
- Q. 4. Deduce the mathematical expression of first law of thermodynamics for the following processes : (i) Isothermal process (ii) Isobaric process. (2)

- Q. 5.** Dissociation constant of acetic acid is 1.8×10^{-5} . Calculate per cent dissociation of acetic acid in 0.01 M solution.
- Q. 6.** What is van't Hoff factor?
- Q. 7.** Explain the effect of dilution of solution on conductivity.
- Q. 8.** Define the role of real time analysis in pollution prevention.
- Q. 9.** Why are *f*-block elements called inner transition elements?
- Q. 10.** What is the action of conc. sulphuric acid on aniline?
- Q. 11.** Explain the action of concentrated sulphuric acid on phenol at different temperatures.
- Q. 12.** The rate law for the reaction $C_2H_4Br_2 + 3I^- \longrightarrow C_2H_4 + 2Br^- + I_3^-$ is Rate = $k [C_2H_4Br_2][I^-]$. The rate of the reaction is found to be 1.1×10^{-4} M/s when the concentrations of $C_2H_4Br_2$ and I^- are 0.12 M and 0.18 M respectively. Calculate the rate constant of the reaction.
- Q. 13.** Explain the electron gain enthalpy of group 16 elements.
- Q. 14.** Draw diagrams for the optical isomers of a complex, $[Co(en)_3]^{3+}$.

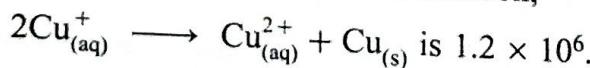
SECTION-C

Attempt any EIGHT of the following questions :

- Q. 15.** Explain the structure of $[Ni(CN)_4]^{2-}$ on the basis of valence bond theory.
- Q. 16.** Explain the hydrolysis of the salt of weak acid and weak base.
- Q. 17.** Complete the following reaction sequences by writing the structural formulae of the organic compounds 'A', 'B' and 'C'.



- Q. 18.** Equilibrium constant of the reaction,



What is the standard potential of the cell in which the spontaneous reaction takes place?

- Q. 19.** Give reasons : Haloarenes are less reactive than haloalkanes.
- Q. 20.** How are solids classified according to electrical conductivity?
- Q. 21.** Aldehydes are more reactive toward nucleophilic addition reaction than ketones. Explain, why.
- Q. 22.** What is enthalpy? Derive the expression, $\Delta H = \Delta U + P\Delta V$.
- Q. 23.** (i) Oxygen has low electron gain enthalpy in group 16 elements. Explain.
(ii) Why are atomic radii of noble gases larger than those of halogens?

- Q. 24. (i) Write the balanced chemical equations for action of dil. H_2SO_4 on diethyl amine.
(ii) Name the four bases present in DNA which of these is not present in RNA. (3)
(iii) Define : Coordination isomers.
- Q. 25. (i) What is meant by 'shielding of electrons' in an atom?
(ii) Explain the variation in atomic or ionic radii of 3d-series elements. (3)
- Q. 26. (i) What is the rate determining step?
(ii) What is reaction intermediate? Explain with an example. (3)

SECTION-D

[12]

Attempt any THREE of the following questions :

- Q. 27. (i) How is standard enthalpy of formation useful to calculate standard enthalpy of reaction?
(ii) Calculate the mass in grams of an impurity of molar mass 100 g mol^{-1} which would be required to raise the boiling point of 50 g of chloroform by $0.30\text{ }^{\circ}\text{C}$. (K_b for chloroform = $3.63\text{ K kg mol}^{-1}$) (4)
- Q. 28. (i) What happens when vapours of primary, secondary and tertiary alcohols are passed over heated copper at 573 K ?
(ii) Explain the action of bromine in carbon disulphide (CS_2) on phenol (carbolic acid). (4)
- Q. 29. (i) What will be the colour of Cd^{2+} salts? Explain.
(ii) (a) What is the oxidation state of S in $H_2S_2O_6$?
(b) What is the oxidation state of oxygen in OF_2 ? (4)
- Q. 30. (i) How is benzoic acid prepared from alkyl benzenes?
(ii) Which is the stronger acid in each of the following pairs?
 $CH_3 - COOH$ and $CH_2 = CH - COOH$ (4)
- Q. 31. (i) Complete the following statements :
Novolak is a copolymer of and
(ii) Identify 'A' and 'B' in the following reaction :
(a) $HO - CH_2 - CH_2 - OH + H - O - \overset{O}{\underset{|}{\text{C}}} \text{---} \text{C}_6H_4 \text{---} \overset{O}{\underset{|}{\text{C}}} - O - H \xrightarrow[\Delta]{533\text{ K}} \text{'A'}$
(b) $H_2N - (CH_2)_6 - NH_2 + HOOC - (CH_2)_4 COOH \xrightarrow[\Delta]{533\text{ K}} \text{'B'}$
- (iii) Name the scientist who discovered scanning tunneling microscopy (STM) in 1980. (4)

PRACTICE PAPER - 2

Time : 3 Hours]

[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 :

(i) In crystal lattice formed by bcc unit cell the void volume is

- (a) 68% (b) 74% (c) 32% (d) 26%

(ii) For pH > 7 the hydronium ion concentration would be

- (a) 10^{-7} M (b) $< 10^{-7}$ M
(c) $> 10^{-7}$ M (d) $\geq 10^{-7}$ M

(iii) Which type of amine does produce N_2 when treated with HNO_3 ?

- (a) Primary amine (b) Secondary amine
(c) Tertiary amine (d) Both primary and secondary amines

(iv) Bond enthalpies of H – H, Cl – Cl and H – Cl bonds are 434 kJ mol^{-1} , 242 kJ mol^{-1} and 431 kJ mol^{-1} respectively. Enthalpy of formation of HCl is

(a) 245 kJ mol^{-1} (b) -93 kJ mol^{-1}
(c) -245 kJ mol^{-1} (d) 93 kJ mol^{-1}

(1)

(v) For the reaction, $2\text{A} \rightarrow 3\text{C}$, the reaction rate is equal to

- (a) $-\frac{d[\text{A}]}{dt}$ (b) $-\frac{1}{2} \frac{d[\text{A}]}{dt}$
(c) $-\frac{1}{3} \frac{d[\text{A}]}{dt}$ (d) $\frac{d[\text{A}]}{dt}$

(1)

(vi) Teflon is chemically inert, due to presence of

- (a) C – H bond (b) C – F bond
(c) H-bond (d) C = C bond

(1)

(vii) Vapour pressure of a solution is

- (a) directly proportional to the mole fraction of the solute
(b) inversely proportional to the mole fraction of the solute
(c) inversely proportional to the mole fraction of the solvent
(d) directly proportional to the mole fraction of the solvent

(1)

(viii) The plastic bottles made of HDPE are used to store household cleaner and shampoo can be recycled to make

- (a) carpets, furniture, new containers
(b) detergent bottles, fencing, floor tiles, pens
(c) custom-made products
(d) cables, mudflaps, panelling, roadway gutters

(1)

(ix) Components of Nichrome alloy are

- (a) Ni, Cr, Fe (b) Ni, Cr, Fe, C
(c) Ni, Cr (d) Cu, Fe

(1)

(x) RNA has

- (a) A-U base pairing (b) P-S-P-S backbone
(c) double helix (d) G-C base pairing

(1)

Q. 2. Answer the following questions :

[8]

- (i) Why are halogens not found in the free state? (1)
(ii) Define buffer solution. (1)
(iii) Write reaction showing conversion of benzonitrile into benzoic acid. (1)
(iv) What is the enthalpy of atomization? Give an example. (1)
(v) Write net charging and discharging reactions for lead storage battery. (1)

- (vi) Is the complex $[\text{CoF}_6]$ cationic or anionic if the oxidation state of cobalt is + 3?
- (vii) Name two gases which deplete ozone layer.
- (viii) Write the structure of optically active alcohol having molecular formula $\text{C}_4\text{H}_{10}\text{O}$.

SECTION-B

Attempt any EIGHT of the following questions :

- Q. 3.** Write electrode reactions for the electrolysis of aqueous NaCl .
- Q. 4.** Explain : *p*-Nitrophenol is a stronger acid than phenol.
- Q. 5.** What are the characteristics of ideal solutions?
- Q. 6.** Comment on the statement : No work is involved in an expansion of a gas in vacuum.
- Q. 7.** (i) What is the action of nitrous acid on aniline?
(ii) Draw a neat diagram for dAMP.
- Q. 8.** The concentration of H^+ ion in lemon juice is 2.5×10^{-3} M. Calculate the OH^- ion concentration and classify the solution as acidic, basic or neutral.
- Q. 9.** Explain the position of lanthanoids in the periodic table.
- Q. 10.** What are essential and non-essential amino acids? Give two examples of each.
- Q. 11.** What are the uses of :
(i) Helium (ii) Argon.
- Q. 12.** Define the following terms :
(i) Nanotechnology (ii) Nanomaterial.
- Q. 13.** Express the rate of a reaction in terms of change in concentration of each constituent in the following reaction :
 $a\text{A} + b\text{B} \rightarrow c\text{C} + d\text{D}$.
- Q. 14.** Write formula of the following complexes :
(i) Potassium amminetrichloroplatinate(II)
(ii) Dicyanoaurate(I) ion.

SECTION-C

Attempt any EIGHT of the following questions :

- Q. 15.** Explain optical isomerism in 2-chlorobutane.
- Q. 16.** (i) What are the units of rate constant of first order reaction?
(ii) Derive the expression for integrated rate law for zero order reaction.
 $\text{A} \longrightarrow \text{Products}$.
- Q. 17.** NH_4OH is 4.3% ionised at 298 K in 0.01 M solution. Calculate the ionization constant and pH of NH_4OH .

- Q. 18. Gold occurs as face centred cube and has a density of 19.30 kg dm^{-3} . Calculate atomic radius of gold. (Molar mass of Au = 197) (3)
- Q. 19. Explain the geometrical isomerism of the octahedral complex of the type $[\text{MA}_4\text{BC}]$ with suitable example. (3)
- Q. 20. Explain the anomalous properties of fluorine. (3)
- Q. 21. Explain the electrolysis of molten NaCl. (3)
- Q. 22. (i) NH_3 is a Lewis base. Explain. (3)
- Q. 23. (ii) Write name of the electrophile used in Kolbe's reaction. (3)
- Q. 24. (iii) What is a laevorotatory substance? (3)
- Q. 25. (i) Define the term anisotropy. (3)
- Q. 26. (ii) Define and explain : Enthalpy of atomisation. (3)
- Q. 27. (iii) Deduce the mathematical expression of first law of thermodynamics for the adiabatic process. (3)
- Q. 28. (i) What are *d*-block elements? Give their general electronic configuration. (3)
- Q. 29. (ii) In which period of the periodic table, will an element be found whose differentiating electron is a $4d$ -electron? (3)
- Q. 30. How will you distinguish primary, secondary and tertiary alcohols by oxidation process? (3)

SECTION-D

Attempt any THREE of the following questions :

[12]

- Q. 27. (i) Define chirality. (4)
- Q. 28. (ii) Write a note on Sandmeyer's reaction. (4)
- Q. 29. (i) Define : (a) Exothermic process (b) Endothermic process. (4)
- Q. 30. (ii) The vapour pressure of water at 20°C is 17 mm Hg. Calculate the vapour pressure of a solution containing 2.8 g of urea (NH_2CONH_2) in 50 g of water. (4)
- Q. 29. (i) How is benzoic acid obtained from – (a) ethyl benzoate (b) styrene? (4)
- Q. 30. (ii) How is benzoic acid obtained from phenyl ethene? (4)
- Q. 31. (iii) How is adipic acid obtained from cyclohexene? (4)
- Q. 30. (i) Why are most of the *d*-block elements called transition elements? (4)
- Q. 31. (ii) Discuss the structure of sulphur dioxide. (4)
- Q. 31. (i) Explain in detail free radical mechanism involved during the preparation of addition polymer. (4)
- Q. 32. (ii) What is the colour of gold nanoparticles? (4)

- Q. 18. Explain Cannizzaro reaction. (3)
- Q. 19. Gold occurs as face centred cube and has a density of 19.30 kg dm^{-3} . Calculate atomic radius of gold. (Molar mass of Au = 197) (3)
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(ii) The vapour pressure of water at 20°C is 17 mm Hg. Calculate the vapour pressure of a solution containing 2.8 g of urea (NH_2CONH_2) in 50 g of water. (4)
- Q. 29. (i) How is benzoic acid obtained from – (a) ethyl benzoate (b) styrene?
(ii) How is benzoic acid obtained from phenyl ethene?
(iii) How is adipic acid obtained from cyclohexene? (4)
- Q. 30. (i) Why are most of the *d*-block elements called transition elements?
(ii) Discuss the structure of sulphur dioxide. (4)
- Q. 31. (i) Explain in detail free radical mechanism involved during the preparation of addition polymer.
(ii) What is the colour of gold nanoparticles? (4)