Roll No _____ (To be filled in by the candidate) **(Academic Sessions 2020 – 2022 to 2023 – 2025)**

CHEMISTRY 224-1st Annual-(INTER PART – I) Time Allowed : 20 Minutes

Q.PAPER – I (Objective Type) GROUP – I Maximum Marks : 17

PAPER CODE = 6483

Note : Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink in the answer-book. Cutting or filling two or more circles will result in zero mark in that question.

1-1	Equal masses of methane and oxygen gases are mixed in an empty container at 25 °C. The fraction of the total pressure exerted by oxygen is : (A) $\frac{1}{3}$ ● (B) $\frac{8}{9}$ (C) $\frac{1}{9}$ (D) $\frac{16}{17}$
2	Orbitals having same energy are called : (A) Hybrid orbitals (B) Valence orbitals (C) ● Degenerate orbitals (D) d-orbitals
3	For which system does the equilibrium constant K_c has units of (concentration)$^{-1}$: (A) $N_2 + 3H_2 \rightleftharpoons 2NH_3$ (B) $H_2 + I_2 \rightleftharpoons 2HI$ (C) ● $2NO \rightleftharpoons N_2O_4$ (D) $2HF \rightleftharpoons H_2 + F_2$
4	All the photochemical reactions are usually : (A) First order reactions (B) Second order reactions (C) Zero order reactions ● (D) Third order reactions
5	The largest number of molecules are present in : (A) 3.6 g of H_2O ● (B) 4.8 g of C_2H_5OH (C) 2.8 g of CO (D) 5.4 g of N_2O_5
6	Which of the following hydrogen halide has the highest percentage of ionic character : (A) HCℓ (B) HBr (C) HF ● (D) HI
7	The colour of iodine in organic layer is : (A) Brown (B) Colourless (C) Purple ● (D) Green
8	The bond order of N_2 molecule is : (A) Zero (B) Three ● (C) Two (D) One
9	The cathodic reaction in the electrolysis of dil. H_2SO_4 with pt electrode is : (A) Oxidation (B) Reduction ● (C) Both oxidation and reduction (D) Neither oxidation or reduction
10	ΔH_v value of C_6H_{14} should be ---- than that of C_2H_6 : (A) Greater ● (B) Lesser (C) Equal to (D) Always lesser
11	The phenomenon of isotopy was introduced by : (A) Soddy ● (B) Avogadro (C) Rutherford (D) Max plank
12	Diamond is bad conductor because : (A) It has a tight structure (B) It has high density (C) There are no free electrons present in the crystal of diamond to conduct electricity ● (D) Is transparent to light
13	During liquefaction of gases the intermolecular spaces : (A) Decreases ● (B) Increases (C) Remains constant (D) Cannot be predicted
14	Rutherford model of atom failed because : (A) The atom did not have a nucleus and electron (B) It did not account for attraction between proton and nucleus (C) It did not account for the stability of atom ● (D) There is actually no space between the nucleus and electron
15	Paper chromatography is known as : (A) Adsorption chromatography (B) Partition chromatography ● (C) Thin layer chromatography (D) Gas chromatography
16	Which one is not a state function : (A) Temperature (B) Internal energy (C) Work ● (D) Volume
17	Molarity of pure water is : (A) 1 (B) 18 (C) 55.5 ● (D) 6

Roll No _____ (To be filled in by the candidate) **(Academic Sessions 2020 – 2022 to 2023 – 2025)**

CHEMISTRY 224-1st Annual-(INTER PART – I) Time Allowed : 2.40 hours

PAPER – I (Essay Type) GROUP – I Maximum Marks : 68

SECTION – I

2. Write short answers to any EIGHT (8) questions : 16

(i) 23 g of sodium and 238 g of uranium have equal number of atoms in them. Justify.

(ii) Why actual yield is always less than theoretical yield?

(iii) Define the term atomicity. Give example.

(iv) Describe Gooch Crucible.

(v) How the fluted filter paper is prepared?

(vi) How the crystals are dried in crystallization?

(vii) Why pilots feel uncomfortable breathing in un-pressurized cabins?

(viii) Derive Charles's law from kinetic molecular theory.

(ix) Some of postulates of kinetic molecular theory are faulty. Justify.

(x) Discuss effect of change in temperature on K_w.

(xi) Justify that chemical equilibrium is dynamic in nature.

(xii) Discuss effect of common ion on solubility.

3. Write short answers to any EIGHT (8) questions : 16

(i) Though oxygen and sulphur belong to same group but water is liquid while H_2S is a gas at room temperature. Why?

(ii) Write four uses of liquid crystals.

(iii) Define crystal lattice with an example.

(iv) Heat of sublimation of iodine is very high. Why?

(v) Define Hund's rule and Pauli's exclusion principle.

(vi) Calculate mass of electron using its e/m value.

(vii) What is origin of X-rays?

(viii) State ($n + \ell$) rule.

(ix) Define the term molarity and molality.

(x) What do you mean by water of crystallization? Give an example.

(xi) Differentiate between average and instantaneous rates of reaction.

(xii) Define zero order reaction. Give an example.

4. Write short answers to any SIX (6) questions : 12

(i) Why $\sigma 2p_x$ is higher in energy in B_2, C_2 and N_2 and lower in energy in O_2 and F_2 in energy level diagram?

(ii) Draw shape and write bond angle in NH_3 and BF_3 molecules with respect to VSEPR theory.

4. (iii) Define electron affinity. Name two factors affecting electron affinity.

(iv) Why lone pair of electron occupy more space than bond pair of electron?

(v) Define state of system and state function.

(vi) Define enthalpy of reaction. Give one example.

(vii) Define spontaneous process. Give one example.

(viii) How impure copper can be purified.

(ix) What is standard hydrogen electrode?

SECTION – II

Note : Attempt any THREE questions.

5. (a) Write all the steps involved in determination of empirical formula. 4

(b) Define evaporation. On what factors it depends? Discuss. 1,1,2

6. (a) 250 cm^3 of hydrogen is cooled from 127 °C to – 27 °C by maintaining the pressure constant. Calculate the new volume of the gas at this low temperature. 4

(b) What is the concept of dual nature of matter? Also derive de-Broglie's equation. 4

7. (a) What is dipole moment? Give its various units. Find relationship between Debye and mc. 4

(b) Calculate the pH of a buffer solution in which 0.11 molar CH_3COONa and 0.09 molar acetic acid solution are present K_a for acetic acid (CH_3COOH) is 1.85×10^{-5}. 4

8. (a) State and explain Hess's law of constant heat summation with an example. 4

(b) Describe the construction and working of standard hydrogen electrode. 4

9. (a) Discuss two types of solutions of liquids in liquids. 4

(b) Define the following with examples : 4

(i) Autocatalysis. (ii) Negative catalysis. (iii) Homogeneous catalysis.
(iv) Enzyme catalysis.

42-224-I-(Essay Type) – 57000

Sl No _____ (To be filled in by the candidate) **(Academic Sessions 2020 – 2022 to 2023 – 2025)**

CHEMISTRY 224-1st Annual-(INTER PART – I) Time Allowed : 20 Minutes

Q.PAPER – I (Objective Type) GROUP – II Maximum Marks : 17

PAPER CODE = 6484

Note : Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink in the answer-book. Cutting or filling two or more circles will result in zero mark in that question.

1-1	The gases show more deviation from ideal behaviour at : (A) Low temperature and high pressure ● (B) High temperature and low pressure (C) High temperature and high pressure (D) Low temperature and low pressure
2	The wave number of the light emitted by a certain source is $2\times10^{6}m^{-1}$. The wavelength of this light will be : (A) 200 nm (B) 500 m (C) 500 nm ● (D) $5\times10^{7}m$
3	The equilibrium constant for the reaction $2O_3 \rightleftharpoons 3O_2$ is 10^{55} at 25 °C. It tells us that at room temperature : (A) ● O_3 is unstable and decomposes rapidly (B) O_3 is highly stable and decomposes slowly (C) O_3 is unstable and decomposes slowly (D) O_3 is highly stable and decomposes rapidly
4	The main function of a catalyst in a chemical reaction is to : (A) Increase Ea (B) Decrease temperature (C) ● Decrease Ea (D) Decrease pressure
5	49 g of aqueous solution of H_2SO_4 contains moles of H^+ ions : (A) 1.0 ● (B) 0.2 (C) 0.4 (D) 0.01
6	Which of the following molecule has zero dipole moment : (A) H_2S (B) SO_2 (C) CO (D) CS_2 ●
7	Solvent extraction is an equilibrium process and it is controlled by : (A) Law of mass action (B) Distribution law ● (C) The amount of solute (D) The amount of solvent used
8	The geometry of PH_3 is : (A) Bent (B) Trigonal planar (C) Tetrahedral (D) ● Trigonal pyramidal
9	Stronger the oxidizing agent, greater is the : (A) Oxidation potential (B) Reduction potential ● (C) Redox potential (D) emf of cell
10	Which type of intermolecular forces are present in chloroform : (A) Hydrogen bonding (B) Dipole-dipole forces ● (C) London forces (D) Dipole-induced forces
11	One mole of CO_2 contains : (A) 6.02×10^{23} atoms of oxygen (B) 18.1×10^{23} molecules of CO_2 (C) 6.02×10^{23} atoms of carbon ● (D) 22 gram atoms of CO_2
12	The solid iodine is the best example of : (A) Ionic solids (B) Covalent solids (C) Metallic solids (D) Molecular solids ●
13	The order of the rate of diffusion of gases NH_3 , SO_2 , $C\ell_2$ and CO_2 is : (A) $NH_3 > SO_2 > C\ell_2 > CO_2$ (B) $NH_3 > CO_2 > SO_2 > C\ell_2$ ● (C) $C\ell_2 > SO_2 > CO_2 > NH_3$ (D) $NH_3 > CO_2 > C\ell_2 > SO_2$
14	Quantum number values for 2p orbitals are : (A) $n=2, \ell=1$ ● (B) $n=1, \ell=2$ (C) $n=1, \ell=0$ (D) $n=2, \ell=0$
15	Which of the following substance is used as drying agent in desiccator : (A) NaCℓ (B) Animal Charcoal (C) $NH_4C\ell$ (D) ● Anhydrous $CaC\ell_2$
16	At constant volume, q_v is equal to : (A) ΔH (B) ΔE ● (C) ΔP (D) ΔV
17	18 g glucose is dissolved in 90 g of water. The relative lowering of vapour pressure is equal to : (A) 1/5 (B) 5.1 (C) 1/51 ● (D) 6

Roll No _____ (To be filled in by the candidate) **(Academic Sessions 2020 – 2022 to 2023 – 2025)**

CHEMISTRY 224-1st Annual-(INTER PART – I) Time Allowed : 2.40 hours

PAPER – I (Essay Type) GROUP – II Maximum Marks : 68

SECTION – I

2. Write short answers to any EIGHT (8) questions : **16**

(i) What are molecular ions, give two examples?

(ii) Define stoichiometry.

(iii) What is importance of limiting reactant?

(iv) Why is sintered glass crucible superior than Gooch Crucible?

(v) What is solvent extraction?

(vi) Write quantitative statement of Charles's law.

(vii) Differentiate between quantitative and qualitative analysis.

(viii) What is compressibility factor, write its value for an ideal gas?

(ix) Write two characteristics of plasma.

(x) Differentiate between equilibrium constant " K_c " and chemical equilibrium.

(xi) Derive expression of K_c for $NH_3(g)$ synthesis by Hyber process.

(xii) Define pH and pOH.

3. Write short answers to any EIGHT (8) questions : **16**

(i) Ionic crystals are highly brittle. Explain with reason.

(ii) HF is the weakest acid among all halogen acids. Why?

(iii) Differentiate between crystalline and amorphous solids.

(iv) Evaporation takes place at all temperatures. Explain with reason.

(v) How neutron decays? Give reaction.

(vi) What is atomic emission spectrum? Explain.

(vii) Give importance of Moseley's law. (Any two)

(viii) State ($n + \ell$) rule. Give its importance.

(ix) What do you mean by the term activation of a catalyst? Give example.

(x) Define order of reaction by giving example.

(xi) What do you mean by water of crystallization? Give two examples.

(xii) Define mole fraction in solutions by giving one example.

4. Write short answers to any SIX (6) questions : **12**

(i) Bond distance is a compromised distance between two atoms. Justify the statement.

(ii) Sketch the hybrid orbitals of : (i) PCl_3 (ii) NH_4^+

4. (iii) Define bond energy. What are factors influencing bond energy?

(iv) Why is sigma (σ) bond stronger than pi (π) bond?

(v) Define lattice energy. Give one example.

(vi) How do you determine ΔH for food and fuel in laboratory?

(vii) Define Hess's law of constant heat summation.

(viii) Na & K can displace hydrogen from acids but Pt, Pd and Cu can not. Why?

(ix) Give the reactions taking place in silver oxide battery.

SECTION – II

Note : Attempt any THREE questions.

5. (a) Explain evidence of atom in detail. 4

(b) Define metallic solids. Discuss metallic solids in terms of electron gas theory and molecular orbital theory. 1,3

6. (a) What pressure is exerted by a mixture of 2.00 g of H_2 and 8.00 g of N_2 at 273 K in a $10\,dm^3$ vessel? 4

(b) Explain J.J Thomson's experiment for determination e/m value of electron. 4

7. (a) Define hybridization. Explain sp hybridization by taking example of ethyne. 1,3

(b) Calculate the pH of a buffer solution in which 0.11 molar CH_3COONa and 0.09 molar acetic acid solution are present K_a for CH_3COOH is 1.85×10^{-5}. 4

8. (a) Define the following with suitable example : 2,2
(i) Enthalpy of neutralization. (ii) Enthalpy of formation.

(b) Define oxidation number. Also write rules for assigning oxidation number. 1,3

9. (a) How boiling point elevation is measured by Landsberger's method? 4

(b) Differentiate between homogeneous catalysis and heterogeneous catalysis with one example of each. 2,2

Roll No. : _____

Objective Paper Code **6485**

Intermediate Part First

CHEMISTRY (Objective) GROUP - I

Time: 20 Minutes Marks: 17

Q.No.1 **You have four choices for each objective type question as A, B, C and D. The choice which you think is correct, fill the relevant circle in front of that question number on computerized answer sheet. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero marks in that question. Attempt as many questions as given in objective type question paper and leave other circles blank.**

S.#	Questions	A	B	C	D
1	The number of neutrons present in $^{39}_{19}K$ is:	39	18	20 ●	19
2	Which is a pseudo solid?	CaF_2	Glass ●	$NaC\ell$	$KC\ell$
3	When $a \neq b \neq c$ and $\alpha = \gamma = 90°$, $\beta \neq 90°$ then it is:	Monoclinic ●	Diclinic	Triclinic	Polyclinic
4	Density of an ideal gas can be calculated by the formula:	PV = dRT	PM = dPV	$d = \frac{RT}{PM}$	$d = \frac{PM}{RT}$ ●
5	One atmosphere is equal to:	760mm of Hg ●	1000mm of Hg	760cm of Hg	20 psi
6	The comparative rates at which the solutes move in paper chromatography, depend on:	The size of the paper	R_f values of solutes ●	Temperature of the experiment	Size of the chromatogram
7	The drying agent used in desiccator is:	$NaC\ell$	KBr	$CaC\ell_2$ ●	$BaC\ell_2$
8	The number of moles of CO_2 which contain 8.0g oxygen:	0.25 ●	0.50	1.0	1.50
9	The mass of one mole of electrons is:	1.008g	0.55mg ●	0.184g	1.673mg
10	Glucose is converted into ethanol by the enzyme _____ present in yeast.	Urease	Invertase	Sucrose	Zymase ●
11	If the salt bridge is not used between two half cells, then the voltage:	Decrease rapidly	Decrease slowly	Does not change	Drops to zero ●
12	A solution of glucose is 10% $\frac{w}{v}$. The volume in which 1g mole of it is dissolved will be:	$1dm^3$	$1.8dm^3$ ●	$200cm^3$	$900cm^3$
13	pH of pure water is:	4.4	5.4	7.0 ●	8.0
14	One calorie is equivalent to:	0.4184J	41.84J	4.184J ●	418.4J
15	Which element has smaller size?	Na	K	Aℓ	Li ●
16	Which molecule has zero dipole moment?	NH_3	$CHC\ell_3$	H_2O	BF_3 ●
17	The number of electrons in the outermost shell of chloride ($C\ell^-$) ion is:	17	03	01	08 ●

1113-XI124-50000

Intermediate Part First Roll No. _____

pakcity.org CHEMISTRY (Subjective) GROUP - I

Time: 02:40 Hours Marks: 68

SECTION – I

2. **Write short answers of any EIGHT parts.** 16
   (i) Calculate average atomic mass of neon.
   (ii) Define molar volume. Give one example.
   (iii) What is the function of electric field in mass spectrometer?
   (iv) How crystals are dried in an oven?
   (v) Write any two uses of chromatography.
   (vi) Define crystallization.
   (vii) Write any four properties of gases.
   (viii) Convert 40°C into Kelvin scale.
   (ix) Write two faulty assumptions of kinetic molecular theory.
   (x) Differentiate between reversible and irreversible reactions.
   (xi) State law of mass action.
   (xii) State common ion effect.

3. **Write short answers of any EIGHT parts.** 16
   (i) What are dipole dipole forces? Give one example.
   (ii) Name the factors which affect the London forces.
   (iii) Cleavage of crystals is itself anisotropic behaviour. Explain.
   (iv) Why ice occupies 9% more volume than liquid water?
   (v) Why cathode rays are also called as electrons?
   (vi) Write any four properties of positive rays.
   (vii) Define spectrum and name any two types of spectrums.
   (viii) For azimuthal quantum number, $\ell = 2$ and $\ell = 3$; calculate total values of magnetic quantum number.
   (ix) Define solubility curve. Name its two types.
   (x) Sum of mole fractions of a mixture is always equal to unity. Justify.
   (xi) What do you mean by order of reaction? Give two examples.
   (xii) What is the effect of temperature on rate of chemical reaction?

4. **Write short answers of any SIX parts.** 12
   (i) Name the factors influencing the ionization energy.
   (ii) How sigma and pi bonds are formed?
   (iii) Draw the structure of ethene ($CH_2=CH_2$) using sp^2 hybridization approach.
   (iv) The bond angles of H_2O and NH_3 are not 109.5° like CH_4. Give reason.
   (v) Define system and surroundings.
   (vi) What is standard enthalpy of atomization? Give an example.
   (vii) Differentiate between endothermic and exothermic reactions.
   (viii) Define (a) Electrolysis (b) Oxidation state.
   (ix) A salt bridge maintains electrical neutrality in the cell. Give reason.

SECTION – II Attempt any THREE questions. Each question carries 08 marks.

5. (a) How can we determine the percentage of carbon, hydrogen and oxygen in the given organic compound by combustion analysis? 04
   (b) Define the boiling point. Explain the variation of boiling point with external pressure. 04

6. (a) Discuss defects of Bohr's atomic model. 04
   (b) 250cm^3 of a sample of hydrogen effuses four times as rapidly as 250cm^3 of an unknown gas. Calculate the molar mass of unknown gas. 04

7. (a) Write postulates of VSEPR Theory. Also explain the structures of AB_3 type molecules in detail. (Any two molecules) 02,02
   (b) $N_2(g)$ and $H_2(g)$ combine to give $NH_3(g)$. The value of K_c in this reaction at 500°C is 6.0×10^{-2}. Calculate the value of K_p for this reaction: $N_2(g)+3H_2(g) \rightleftharpoons 2NH_3(g)$ 04

8. (a) Differentiate between spontaneous and non-spontaneous reactions with examples. 04
   (b) Write four important industrial applications of electrolysis. 04

9. (a) Describe phenol-water system in detail for partially miscible liquid. 04
   (b) Write any four characteristics of a catalyst. 04

1113-XI124-50000

Roll No. : _____

Objective Paper Code **6486**

Intermediate Part First

CHEMISTRY (Objective) GROUP - II

Time: 20 Minutes Marks: 17

Q.No.1 You have four choices for each objective type question as A, B, C and D. The choice which you think is correct, fill the relevant circle in front of that question number on computerized answer sheet. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero marks in that question. Attempt as many questions as given in objective type question paper and leave other circles blank.

S.#	Questions	A	B	C	D
1	The wavenumber of the light emitted by a certain source is $2\times10^{6}\ m^{-1}$. The wavelength of this light will be:	500nm	500m	200nm	5×10^{7}m
2	Ionic solids are characterized by:	Low melting point	High vapour pressure	Good conductivity in solid state	Solubility in polar solvents
3	In order to mention the boiling point of water at 110°C, the external pressure should be:	Between 760 torr and 1200 torr	Between 200 torr and 760 torr	765 torr	Any value of pressure
4	Equal _____ of ideal gases at the same temperature and pressure contains _____ number of molecules.	Masses ; Equal	Volume ; Equal	Moles ; Unequal	Volume ; Unequal
5	The molar volume of CO_2 is maximum at:	STP	127°C and 1 atm	0°C and 2 atm	273°C and 2 atm
6	Solvent extraction is particularly useful technique for the separation when the product to be separated is:	Non-volatile or thermally unstable	Volatile or thermally stable	Non-volatile or thermally stable	Volatile or thermally unstable
7	The most common laboratory example of solvent extraction is called:	Ether extraction	Distillation	Sublimation	Crystallization
8	1 mole of glucose has _____ number of hydrogen atoms.	6×22.414	$12\times6.02\times10^{23}$	$6\times6.02\times10^{23}$	$24\times6.02\times10^{23}$
9	The number of moles of CO_2 which contains 8g of oxygen:	0.25	0.50	1.0	1.50
10	In zero order reaction, the rate is independent of:	Temperature of reaction	Concentration of reactants	Concentration of products	None of these
11	If a strip of Cu metal is placed in a solution of $FeSO_4$:	Cu will be deposited	Fe is precipitated out	"Cu and Fe" both dissolves	No reaction takes place
12	The molal boiling point constant is the ratio of the elevation in boiling point to the:	Molarity	Molality	Mole fraction of solvent	Mole fraction of solute
13	Which combination is an acidic buffer?	A $HC\ell + NaC\ell$		C $NH_4OH + NH_4C\ell$	
		B $CH_3COOH + CH_3COONa$		D $NaOH + NaC\ell$	
14	Which system is endothermic as well as spontaneous?	A $H_2O(\ell) \rightarrow H_2O(g)$		C $N_2(g) + O_2(g) \rightleftharpoons 2NO(g)$	
		B $H_2O(g) \rightarrow H_2O(\ell)$		D $NaOH(aq) + HC\ell(aq) \rightarrow NaC\ell(aq) + H_2O(\ell)$	
15	Which molecule has zero dipole moment?	BF_3	H_2O	NH_3	$CHC\ell_3$
16	The bond order of Ne_2 is:	Two	Three	One	Zero
17	When 3d orbital is completely filled the entering electron goes to:	4s	4p	4f	5s

1114-XI124-3000

Intermediate Part First Roll No. _____

pakcity.org

CHEMISTRY (Subjective) GROUP - II

Time: 02:40 Hours Marks: 68

SECTION – I

2. **Write short answers of any EIGHT parts.** 16
   (i) Many reactions taking place in our surrounding involve limiting reactant. Justify with examples.
   (ii) Define mole with example.
   (iii) Discuss reason for low actual yield.
   (iv) Describe sintered glass crucible.
   (v) Discuss folding of filter paper briefly.
   (vi) Give uses of chromatography.
   (vii) Define effusion with one example.
   (viii) Explain Boyl's law from kinetic molecular theory of gases.
   (ix) Derive units of 'a' and 'b' used in van der Waals equation of real gas.
   (x) How K_c is used to predict direction of reaction?
   (xi) Discuss effect of pressure change on reaction $2SO_2(g)+O_2(g) \rightleftharpoons 2SO_3(g)$
   (xii) Define pK_a and pK_b

3. **Write short answers of any EIGHT parts.** 16
   (i) Complete these nuclear reactions: (a) ${}^{4}_{2}He + {}^{9}_{4}Be \rightarrow$ (b) ${}^{14}_{7}N + {}^{1}_{0}n \rightarrow$
   (ii) Differentiate between continuous and line spectrum.
   (iii) Calculate ionization energy of H-atom.
   (iv) Give relationship between (a) Energy and Frequency (b) Frequency and wavelength
   (v) What are advantages of vacuum distillation?
   (vi) Evaporation is a cooling process. Explain why?
   (vii) The crystals showing isomorphism mostly have the same atomic ratios. Explain the statement.
   (viii) Molecular solids are relatively soft. Why?
   (ix) Define upper consulate temperature.
   (x) What are azeotropic mixture?
   (xi) What do you mean by poisoning of a catalyst?
   (xii) What do you mean by heterogeneous catalysis? Give two examples.

4. **Write short answers of any SIX parts.** 12
   (i) Why size of anion is always larger than its neutral atom?
   (ii) Why second ionization energy is greater than first?
   (iii) Define bond length. Give two factors affecting bond length.
   (iv) Define bond order. Give its formula.
   (v) Burning of candle is spontaneous process. Justify.
   (vi) Define enthalpy of combustion. Give one example.
   (vii) Why enthalpy of some compounds cannot be measured directly?
   (viii) What is anodized aluminum? Give its use.
   (ix) What is the function of salt bridge?

SECTION – II Attempt any THREE questions. Each question carries 08 marks.

5. (a) What is limiting reactant? How does it control the quantity of the product formed? Explain with three examples. 04
   (b) What are covalent solids? Discuss six properties of covalent solids in detail. 04

6. (a) What pressure is exerted by a mixture of 2.00g of H_2 and 8.00g of N_2 at 273K in a $10dm^3$ vessel? 04
   (b) Write four defects of Bohr's model. 04

7. (a) Define orbital hybridization and explain the structure of ethyne (C_2H_2) according to hybridization concept. 01,03
   (b) The solubility product of Ag_2CrO_4 is 2.6×10^{-2} at 25°C. Calculate the solubility of the compound. 04

8. (a) Explain Hess's law of constant heat summation giving one example. 04
   (b) Describe the construction and working of galvanic cell. 04

9. (a) Explain the measurement of boiling point elevation by Landsberger's method. 04
   (b) Explain the effect of concentration of reactants on rate of reaction. 04

1114-XI124-3000

Roll No. of Candidate : _____

CHEMISTRY **Intermediate Part-I , Class 11th (1stA 324- IV)** **Paper : I** **Group – I**

Time: 20 Minutes **OBJECTIVE** **Code : 6487** **Marks: 17**

Note: You have four choices for each objective type question as A, B, C and D. The choice which you think is correct, fill that circle in front of that question number. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero mark in that question.

1. 1 - Gooch Crucible is made up of
(A) glass (B) porcelain ● (C) rubber (D) plastic

2 - The pH of 10^{-3} moles/dm^3 of an aqueous solution of H_2SO_4 is
(A) 3.0 (B) 2.7 ● (C) 2.0 (D) 1.5

3 - Enzyme used for hydrolysis of sucrose is
(A) invertase ● (B) urease (C) lipase (D) zymase

4 - The partial pressure of Oxygen in lungs is
(A) 159 torr (B) 116 torr ● (C) 130 torr (D) 140 torr

5 - The voltage of Silver Oxide battery is about
(A) 1.5 V ● (B) 2 V (C) 2.5 V (D) 3 V

6 - The change in heat energy of chemical reaction at constant temperature and pressure is called
(A) enthalpy change ● (B) heat of sublimation (C) bond energy (D) internal energy change

7 - Allotropy is the property of
(A) compound (B) mixture (C) element ● (D) molecule

8 - Bond angle of NF_3 is
(A) 102° ● (B) 104° (C) 109.5° (D) 120°

9 - A solution of glucose is 10% w/v. The volume in which its 1g mole is dissolved will be
(A) 1 dm^3 (B) 1.8 dm^3 ● (C) 200 cm^3 (D) 900 cm^3

10 - Decolourizing agent used in crystallization is
(A) P_2O_5 (B) animal charcoal ● (C) $KMnO_4$ (D) $CC\ell_4$

11 - The number of isotopes of Nickle are
(A) 2 (B) 3 (C) 5 ● (D) 7

12 - Number of molecules in 1dm^3 of water is close to
(A) $\frac{6.02}{22.4}\times10^{23}$ (B) $\frac{12.04}{22.4}\times10^{23}$ (C) $\frac{18}{22.4}\times10^{23}$ (D) $55.5\times6.02\times10^{23}$ ●

13 - Splitting of spectral lines when atoms are subjected to strong electric field is called
(A) Zeeman's effect (B) Stark effect ● (C) photoelectric effect (D) Compton effect

14 - Bond order of O_2 according to MOT is
(A) 1 (B) 2 ● (C) 3 (D) 4

15 - $(n + \ell)$ value for 4p orbital is
(A) 4 (B) 5 (C) 6 ● (D) 7

16 - Which of following will have Hydrogen bonding in its molecules
(A) C_2H_5OH ● (B) $CC\ell_4$ (C) I_2 (D) $NaC\ell$

17 - The empirical formula of glucose $C_6H_{12}O_6$ is
(A) $C_6H_{12}O_6$ (B) CHO (C) CH_2O ● (D) CH_2O_2

217-(IV)-1stA 324-33000

CHEMISTRY **Intermediate Part-I , Class 11th (1stA 324)** **Paper : I** **Group – I**

Time: 2:40 Hours **SUBJECTIVE** **Marks: 68**

Note: Section-I is compulsory. Attempt any THREE (3) questions from Section-II.

SECTION – I

2. Write short answers to any EIGHT questions. **(2 x 8 = 16)**

i - Why atom cannot be visualized by ordinary microscope?
ii - Calculate number of gram atoms in 0.1 Kg of Na (At. wt of Na = 23 a.m.u)
iii - How can limiting reactant be identified?
iv - How can rate of filteration be enhanced?
v - What is chromatography? Write its uses.
vi - What is R_f value? Write its unit.
vii - In a graph of P Vs 1/V, what is the result of increase in temperature?
viii - Give two characteristics of plasma.
ix - Differentiate between diffusion and effusion.
x - What is pH of 10^{-4} M $Ba(OH)_2$ solution?
xi - What are conjugate acids and bases?
xii - Define law of mass action.

3. Write short answers to any EIGHT questions. **(2 x 8 = 16)**

i - Why acetone and chloroform are miscible into each other? Show with the help of structures.
ii - Why ice floats on the surface of water?
iii - Define symmetry. What are symmetry elements?
iv - Define unit cell. What are unit cell dimensions?
v - How positive rays are produced?
vi - Define Moseley law. Write down its two important points.
vii - What is Davisson and Germer experiment to verify the dual nature of matter?
viii - Write down two Moseley's conclusions.
ix - Molal aqueous solutions are more dilute than molar solutions. Justify.
x - Write down any two characteristics of ideal solutions.
xi - Define half-life period. Give mathematical formula of half-life period for second order and third order reaction.
xii - What is autocatalysis? Give one example.

4. Write short answers to any SIX questions. **(2 x 6 = 12)**

i - Write down factors influencing electron affinity.
ii - Cationic radius is less than its parent atom why?
iii - How electronegativity changes in a group?
iv - Bond distance is the compromise distance between two atoms. How?
v - What are exothermic reactions? Give example.
vi - Define enthalpy of combustion. Give example.
vii - State first law of thermodynamics.
viii - The Nickle Cadmium cell is called rechargeable cell. Give electrodic reactions.
ix - Impure Cu can be purified by electrolytic process. How?

(Turn Over)

SECTION – II

5. (a) Differentiate the following with examples. **(2+2=4)**

(i) Empirical and Molecular formula

(ii) Mole and Avogadro's number

(b) Define Hydrogen Bonding and explain any three applications of it. **(4)**

6. (a) One mole of methane is maintained at 300 K. Its volume is 250 cm^3. Calculate the pressure exerted by the gas when the gas is ideal **(4)**

(b) What is J.J. Thomson's experiment for determining $\frac{e}{m}$ value of electron? **(4)**

7. (a) Explain the shapes of NH_3 and H_2O molecules according to hybridization theory. **(4)**

(b) The solubility product of Ag_2CrO_4 is 2.6×10^{-2} at 25°C. Calculate the solubility of the compound. **(4)**

8. (a) Define 1st law of thermodynamics. Explain it in detail. Also prove that $\Delta E = q_v$ **(4)**

(b) Write electrode reactions for following batteries **(4)**

(i) Alkaline Battery

(ii) Silver Oxide Battery

9. (a) Derive a relationship : $M_2 = \frac{K_f}{\Delta T_f} \cdot \frac{1000\ W_2}{W_1}$ **(4)**

(b) What is half-life period? Prove that $\left[t_{\frac{1}{2}}\right]_n \propto \frac{1}{a^{n-1}}$ **(4)**

217-1st A 324-33000

Roll No. of Candidate : _____

CHEMISTRY **Intermediate Part-I , Class 11th (1stA 324- IV)** **Paper : I** **Group – II**

Time: 20 Minutes **OBJECTIVE Code : 6488** **Marks: 17**

Note: You have four choices for each objective type question as A, B, C and D. The choice which you think is correct, fill that circle in front of that question number. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero mark in that question.

1. 1 - The compound which can undergo sublimation is
(A) $KMnO_4$ (B) $CaCO_3$ (C) NH_4Cl ● (D) Na_2CO_3

2 - For which system does the equilibrium constant (Kc) has units of $(concentration)^{-1}$?
(A) $N_2 + 3H_2 \rightleftharpoons 2NH_3$ (B) $H_2 + I_2 \rightleftharpoons 2HI$
(C) $2NO_2 \rightleftharpoons N_2O_4$ ● (D) $2HF \rightleftharpoons H_2 + F_2$

3 - The unit of the rate constant is the same as that of the rate of reaction in
(A) first order reaction (B) second order reaction
(C) third order reaction (D) zero order reaction ●

4 - At room temperature, the rate of diffusion of N_2 and CO is same, because
(A) both are diatomic gases (B) both are non-polar gases
(C) both have multiple bonds (D) both have same molar mass ●

5 - In the reaction $K_2Cr_2O_7 + 14HCl \rightarrow 2KCl + 2CrCl_3 + 3Cl_2 + 7H_2O$ the oxidation state of Cr changes from
(A) +1 to +7 (B) +6 to +3 ● (C) +7 to –1 (D) +2 to +3

6 - For the reaction $NaOH + HCl \rightarrow NaCl + H_2O$, the change in enthalpy is called
(A) heat of reaction (B) heat of neutralization ●
(C) heat of formation (D) heat of combustion

7 - Which of the following is not a pseudo solid?
(A) Glass (B) rubber (C) NaCl ● (D) plastics

8 - Which of the following compounds has the highest percentage of ionic character?
(A) HI (B) HBr (C) HCl (D) HF ●

9 - Which of the following solutions has the highest boiling point?
(A) 5.85% solution of NaCl ● (B) 18.0% solution of $C_6H_{12}O_6$
(C) 6.0% solution of Urea (D) all have the same boiling points

10 - Solvent extraction method is a particularly useful technique for separation when the product to be separated is
(A) volatile or thermally stable (B) volatile or thermally unstable
(C) non- volatile or thermally unstable (D) non- volatile or thermally stable ●

11 - The total number of covalent bonds in 4.5 g of water is
(A) 6.02×10^{23} (B) 6.02×10^{22} (C) 3.01×10^{22} (D) 3.01×10^{23} ●

12 - The deviation of a gas from ideal behaviour is maximum at
(A) –10°C and 5.0 atm ● (B) –10°C and 2.0 atm
(C) 100°C and 2.0 atm (D) 0°C and 2.0 atm

13 - When 6d orbital is complete, the entering electron goes into
(A) 7f (B) 7s (C) 7p ● (D) 7d

14 - The geometry of NH_3 is
(A) linear (B) trigonal planar (C) tetrahedral (D) trigonal pyramidal ●

15 - The velocity of photon is
(A) independent on its wavelength ● (B) depends on its wavelength
(C) equal to square of its amplitude (D) depends on its source

16 - In order to keep the boiling point of water at 110°C, the external pressure should be
(A) between 200 torr and 760 torr (B) between 760 torr and 1200 torr ●
(C) 765 torr (D) below 765 torr

17 - The largest number of molecules are present in
(A) 3.6 g of H_2O ● (B) 4.8 g of C_2H_5OH (C) 2.8 g of CO (D) 5.4 g of N_2O_5

CHEMISTRY **Intermediate Part-I , Class 11th (1stA 324)** **Paper : I** **Group – II**

Time: 2:40 Hours **SUBJECTIVE** **Marks: 68**

Note: Section-I is compulsory. Attempt any THREE (3) questions from Section-II.

SECTION – I

2. Write short answers to any EIGHT questions. **(2 x 8 = 16)**

i - Differentiate between experimental yield and theoretical yield.
ii - Differentiate between atom and molecule.
iii - Mg atom is twice heavier than Carbon atom. Justify it.
iv - Write four features of a solvent used in crystallization.
v - What is crystallization? Give its basic principle.
vi - How coloured impurities are removed from a crystal?
vii - Why liquids are less common in universe than gases and solids?
viii - How Dalton's law is helpful in respiration?
ix - Derive Charle's law from Kinetic equation of gas.
x - Write relationship between Kc and Kp.
xi - What is ionic product constant of water? How do temperature affect it?
xii - State law of Mass action.

3. Write short answers to any EIGHT questions. **(2 x 8 = 16)**

i - Iodine dissolves readily in tetrachloromethane. Give reason.
ii - Define polarizability. Give its significance.
iii - Define unit cell. Name crystallographic elements.
iv - Boiling needs constant supply of heat. Explain with reason.
v - State any two properties of positive rays.
vi - What is line spectrum? Give any one example.
vii - State Moseley's Law.
viii - State Hund's Rule. Give an example.
ix - Define Catalysis. Give two examples.
x - What is specific rate constant? Explain
xi - Aqueous solution of CH_3COONa is basic in nature. Give reason.
xii - Define molality. Give its units.

4. Write short answers to any SIX questions. **(2 x 6 = 12)**

i - Why does lone-pair occupy more space than bonding pair?
ii - Radius of Cation is smaller than parent atom. Justify.
iii - How bond length is affected by change in hybridization state?
iv - Define electronegativity.
v - Define the term standard enthalpy of neutralization.
vi - What is state function? Give one example.
vii - Discuss endothermic reaction with example.
viii - Lead accumulator is chargeable battery. Justify.
ix - Calculate oxidation number of Phosphorous in Na_3PO_4.

(Turn Over)

SECTION – II

5. **(a)** What are limiting reactants? How are they identified? Give an example. **(2+1+1 =4)**

(b) What are ionic solids? Give their three properties. **(4)**

6. **(a)** 250 cm^3 of Hydrogen gas is cooled from 127°C to –27°C by maintaining the pressure constant. Calculate the new volume of gas at low temperature. **(4)**

(b) Write down measurement of $\frac{e}{m}$ by J.J. Thomson with diagram. **(4)**

7. **(a)** Explain formation of Oxygen molecule according to Molecular Orbital Theory. Also draw diagram and calculate bond order. **(4)**

(b) What is the percentage ionization of acetic acid in solution in which 0.1 mol of it has been dissolved per dm^3 of the solution? **(4)**

8. **(a)** State 1st Law of Thermodynamics and prove $\Delta E = q_v$ **(4)**

(b) Define electrochemical series. Discuss calculation of the voltage of cell by giving one example. **(4)**

9. **(a)** Define the following terms: **(4)**

(i)	Hydration	(ii)	Hydrates
(iii)	Mole fraction	(iv)	parts per million (ppm)

(b) Discuss four factors that affect the rate of reactions. **(4)**

218-1st A 324-33000

Paper Code Number: 2481	2024 (1st-A) INTERMEDIATE PART-I (11th Class)	Roll No: _____
CHEMISTRY PAPER-I GROUP-I		
TIME ALLOWED: 20 Minutes	OBJECTIVE	MAXIMUM MARKS: 17

Q.No.1 You have four choices for each objective type question as A, B, C and D. The choice which you think is correct, fill that bubble in front of that question number, on bubble sheet. Use marker or pen to fill the bubbles. Cutting or filling two or more bubbles will result in zero mark in that question.

S.#	QUESTIONS	A	B	C	D
1	The largest number of molecules are present in:	3.6g of H_2O ●	4.8g of C_2H_5OH	2.8g of CO	5.4g to N_2O_5
2	The number of isotopes of nickel are:	1	3	5 ●	7
3	Iodine dissolved in water in presence of KI is due to formation of given species:	I_2	I'	I_4^{-1}	I_3^{-1} ●
4	The comparative rates at which solute moves in paper chromatography depends on:	Size of paper	R_f value of solute ●	Temperature of experiment	Size of chromatographic tank
5	Which of given will have highest rate of diffusion?	O_2	CO_2	NH_3 ●	SO_2
6	Molar volume of CO_2 is maximum at:	S.T.P	127^oC and 1 atm ●	0^oC and 2 atm	273^oC and 2 atm
7	At Murree hills water boils at:	98^oC ●	100^oC	0^oC	50^oC
8	The molecules of CO_2 in dry ice form the:	Ionic crystals	Covalent crystals	Molecular crystals ●	Any type of crystals
9	Orbitals having same energy are called:	Hybrid orbitals	Valence orbitals	d-orbitals	Degenerate orbitals ●
10	The nature of positive rays depends upon:	The nature of electrodes	Nature of discharge tube	The nature of residual gas ●	All of these
11	Which of given species has unpaired electrons in anti-bonding molecular orbitals?	N_2^{-2} ●	O_2^{+2}	B_2	F_2
12	The bond order of N_2 molecule according to Molecular Orbital Theory is:	Zero	01	02	03 ●
13	For a given process the heat changes at constant pressure(q_p) and at constant volume(q_v) are related to each other as:	$q_p = q_v$	$q_p < q_v$	$q_p > q_v$ ●	$q_p = \frac{q_v}{2}$
14	pH of pure water is:	7.0 ●	5.4	4.4	8.0
15	Molarity of pure water is:	1	18	55.5 ●	6
16	If salt bridge is not used between two half cells then the voltage:	Decreases rapidly	Decreases slowly	Does not change	Drops to zero ●
17	The unit of rate constant is same as that of rate of reaction in:	First order reaction	Second order reaction	Zero order reaction ●	Third order reaction

INTERMEDIATE PART-I (11th Class)		Roll No:
CHEMISTRY PAPER-I GROUP-I		
TIME ALLOWED: 2.40 Hours	**SUBJECTIVE**	**MAXIMUM MARKS: 68**

NOTE: Write same question number and its parts number on answer book, as given in the question paper.

SECTION-I

2. Attempt any eight parts. **8 × 2 = 16**

(i)	Differentiate between ion and molecular ion.
(ii)	What are macromolecules? Give an example.
(iii)	What is justification of two strong peaks in the mass spectrum for bromine while for iodine only one peak at 127 a.m.u is indicated?
(iv)	Define sublimation. Give two examples.
(v)	Give two applications of paper chromatography.
(vi)	What do you mean by distribution coefficient?
(vii)	What is absolute zero?
(viii)	Give two conditions when gases deviate from ideal behaviour.
(ix)	Joule Thomson effect produces cooling. How?
(x)	How can direction of a reversible reaction be predicted by K_C?
(xi)	Define Buffer capacity.
(xii)	Give two applications of solubility product.

3. Attempt any eight parts. **8 × 2 = 16**

(i)	Why boiling point of H_2O is greater than HF?
(ii)	Evaporation causes cooling. Justify.
(iii)	What is habit of crystal? What is the effect of impurity on shape of crystal?
(iv)	Define Allotropy. Write names of two elements showing allotropy.
(v)	Why positive rays are called canal rays?
(vi)	How dual nature of matter was got verified by Davison and Germer experimentally?
(vii)	How slow neutrons are used to carry out radioactive reactions by emitting gamma radiations?
(viii)	Cathode rays travel in a straight line. Justify with diagram.
(ix)	What is the effect of temperature on phenol-water system?
(x)	Why $AlCl_3$ and $CuSO_4$ give acidic solution in water? Give chemical equation of each.
(xi)	What is dilatometric and refractrometric method for the determination of concentration of reactant?
(xii)	What is activation of catalyst?

4. Attempt any six parts. **6 × 2 = 12**

(i)	What is dipole moment? Give its various units.
(ii)	What is octet rule? Give two examples of compounds which deviate from it?
(iii)	Write the Lewis structures for (i) CS_2 (ii) HCN
(iv)	How do you compare the bond strengths of polar and non-polar molecules?
(v)	Justify that the burning of a candle is a spontaneous process.
(vi)	Define state and state functions with examples.
(vii)	Differentiate between heat and temperature.
(viii)	A salt bridge maintains the electrical neutrality in the cell. Why?
(ix)	Calculate the oxidation number of "S" in $Cr_2(SO_4)_3$.

SECTION-II

NOTE: Attempt any three questions. **3 × 8 = 24**

5.(a)	Define and differentiate between actual and theoretical yield. Explain why actual yield is usually less than theoretical yield.	1+1+2=4
(b)	Describe with the help of diagram the monometric method for the measurement of vapour pressure.	3+1=4
6.(a)	$250cm^3$ of the sample of hydrogen effuses four times as rapidly as $250cm^3$ of a unknown gas. Calculate the molar mass of unknown gas.	4
(b)	State and explain main points of Planck's quantum theory.	4
7.(a)	What is ionization energy? Discuss the variation of ionization energy in the periodic table.	4
(b)	The solubility product of Ag_2CrO_4 is 2.6×10^{-2} at 25^oC. Calculate the solubility of the compound.	4
8.(a)	Explain the glass calorimetric method for the measurement of enthalpy of reaction.	4
(b)	Define standard electrode potential. Explain the measurement of electrode potential of copper.	4
9.(a)	Explain Beckmann's Method for measuring depression in freezing point.	4
(b)	Explain the effect of temperature on the rate constant of a reaction by "Arrhenius Equation".	4

21-2024(1st-A)-20000 (MULTAN)

Paper Code Number: 2482	2024 (1^{st}-A) INTERMEDIATE PART-I (11^{th} Class)	Roll No:
CHEMISTRY PAPER-I GROUP-II	11th Class Chemistry Objective Paper Group 2 Multan Board 2024	
TIME ALLOWED: 20 Minutes	OBJECTIVE	MAXIMUM MARKS: 17

Q.No.1 **You have four choices for each objective type question as A, B, C and D. The choice which you think is correct, fill that bubble in front of that question number, on bubble sheet. Use marker or pen to fill the bubbles. Cutting or filling two or more bubbles will result in zero mark in that question.**

S.#	QUESTIONS	A	B	C	D
1	The number of isotopes of tin(Sn) is:	Six	Nine	Eleven ●	Three
2	27g of $A\ell$ will react completely with how much mass of O_2 to produce $A\ell_2O_3$?	8g of oxygen	16g of oxygen	32g of oxygen	24g of oxygen ●
3	A complete quantitative analysis consists of how many major steps:	Two	Five	Four ●	Three
4	Solvent extraction method is particularly useful technique for separation, when the product to be separated is:	Non volatile or thermally unstable	Volatile or thermally stable	Non volatile or thermally stable	Volatile or thermally unstable ●
5	The melting point of ice on Kelvin Scale, at 1 atmospheric pressure is:	273K ●	373K	0K	– 273 K
6	Equal masses of methane and oxygen are mixed in an empty container at 25^oC. The fraction of total pressure exerted by oxygen is:	$\frac{1}{9}$	$\frac{8}{9}$	$\frac{1}{3}$ ●	$\frac{16}{17}$
7	In order to maintain the boiling point of water at 110^oC, the external pressure should be:	Between 200 torr and 760 torr	Between 760 torr and 1200 torr ●	765 torr	Any value of torr
8	Ionic solids are characterized by:	Low melting points	Good conductivity in solid state	High vapour pressure	Solubility in polar solvents ●
9	Splitting of spectral lines when atoms are subjected to strong electric field is called:	Zeeman effect	Stark effect ●	Compton effect	Photoelectric effect
10	Quantum number values for 2p orbitals are:	$n=2,\ \ell=1$ ●	$n=1,\ \ell=2$	$n=1,\ \ell=0$	$n=2,\ \ell=0$
11	The most electronegative element of the periodic table is:	Chlorine	Bromine	Fluorine ●	Iodine
12	Which molecule shows linear molecular geometry?	CH_4	$A\ell Cl_3$	H_2O	$BeCl_2$ ●
13	Calorie is equivalent to:	0.4184 J	41.8 J	4.18 J ●	418.4 J
14	The solubility product of $AgC\ell$ is $2.0\times10^{-10}\ mole^2\ dm^{-6}$. The maximum concentration of Ag^+ ions in the solution is:	2.0×10^{-10} $mole\ dm^{-3}$ ●	1.41×10^{-5} $mole\ dm^{-3}$	1.0×10^{-10} $mole\ dm^{-3}$	4.0×10^{-20} $mole\ dm^{-3}$
15	A solution of glucose is 10% w/v. The volume in which 1g mole of it is dissolved will be:	$1.8\,dm^3$ ●	$1\,dm^3$	$200\,cm^3$	$900\,cm^3$
16	If the salt bridge is not used between two half cells, the voltage:	Decreases rapidly	Decreases slowly	Does not change	Drops to zero ●
17	With increase of 10^oC temperature, the rate of reaction doubles. This increase in rate of reaction is due to:	Decrease in activation energy of reaction	Decrease in the number of collisions between reactant molecules	Increase in effective collisions ●	Increase in activation energy of reactants

CHEMISTRY PAPER-I GROUP-II

TIME ALLOWED: 2.40 Hours | **SUBJECTIVE** | **MAXIMUM MARKS: 68**

NOTE: Write same question number and its parts number on answer book, as given in the question paper.

SECTION-I

2. Attempt any eight parts. **8 × 2 = 16**

(i) What is the principle of mass spectrometry?

(ii) *23g* of sodium and *238g* of uranium have equal number of atoms in them. Give the reason.

(iii) Define gram atom. Give two examples.

(iv) What is R_f value? Give its formula.

(v) Write down the four main characteristics of the solvent used for crystallization.

(vi) What is solvent extraction? Give its importance.

(vii) Gases deviate more significantly at high pressure and low temperature. Why?

(viii) How do you differentiate between effusion and diffusion of gases?

(ix) Derive Graham's law of diffusion from kinetic molecular theory of gases.

(x) Give two applications of common ion effect.

(xi) Why do the equilibrium constant value has its units for some of the reversible reactions but has no units for some other reactions?

(xii) How can we prepare acidic buffers? Give an example.

3. Attempt any eight parts. **8 × 2 = 16**

(i) Why water is liquid but hydrogen sulphide is gas at room temperature?

(ii) How dynamic equilibrium is established in a close vessel?

(iii) Why molar heat of vapourization is greater than molar heat of fusion?

(iv) Why liquid crystals are used as temperature sensors?

(v) Write reason for production of positive rays.

(vi) How will you justify that cathode rays move in straight line?

(vii) Write any two postulates of Plank's Quantum Theory.

(viii) Calculate wave number of second spectral line of Balmer series.

(ix) $NaC\ell$ and KNO_3 are used to lower the melting point of ice. Why?

(x) Why non-ideal solutions do not obey Raoult's law?

(xi) Differentiate between rate of reaction and rate constant of a reaction.

(xii) What is heterogenous catalysis? Give an example.

4. Attempt any six parts. **6 × 2 = 12**

(i) Impure copper can be purified by electrolytic process. Explain by giving reason.

(ii) Calculate the oxidation number of underlined elements $\underline{Cr}_2(SO_4)_3$; $Na_2\underline{C}O_3$

(iii) What is Thermochemistry? Give examples.

(iv) Define enthalpy of reaction. Give example.

(v) In case of liquids and solids system $\Delta H \approx \Delta E$. Explain.

(vi) Bond distance is the compromise distance between two atoms. Explain with reason.

(vii) The melting points of electrovalent compounds are higher than covalent compounds. Explain with reason.

(viii) There is no bond in chemistry with 100% ionic character. Explain.

(ix) The atomic radius cannot be measured precisely. Explain with reason.

SECTION-II

NOTE: Attempt any three questions. **3 × 8 = 24**

5.(a) Define stoichiometry. Write two assumptions of stoichiometry. Give example. 4

(b) Define boiling point. Explain effect of external pressure on boiling point. 4

6.(a) Calculate the mass of 1 dm^3 of NH_3 gas at $30^\circ C$ and *1000 mm Hg* pressure considering that NH_3 behaving ideally. 4

(b) Differentiate between atomic emission and atomic absorption spectrum with diagram. 4

7.(a) What is paramagnetic character? Give the reason for paramagnetic character of oxygen (O_2) through orbital picture. 4

(b) The solubility of CaF_2 in water at $25^\circ C$ is found to be $2.05 \times 10^{-4}\ mol\ dm^{-3}$. What is the value of K_{sp} at this temperature? 4

8.(a) Explain construction and working of Bomb calorimeter. Write also formula to calculate q. 3+1=4

(b) Define electrochemical series. Write its any two applications. 1+3=4

9.(a) What do you mean by elevation of boiling point? Explain Landsberger's method for its measurement. 4

(b) Discuss Half Life Method and method of large excess to find order of a reaction. 2+2=4

Chemistry	(C)	L.K.No. 1531	Paper Code No. 6485
Paper I	(Objective Type)	Inter (Ist – A – Exam 2024)	
Time :	20 Minutes	Inter (Part - I)	Group Ist
Marks :	17	Session (2022 – 24) & (2023 – 25)	

Note : Four choices A , B , C ,D to each question are given. Which choice is correct fill that circle in front of that Question No. on the Objective Bubble Sheet. Use Marker or Pen to fill the circles. Cutting or filling two or more circles will result in Zero Mark in that Question.

Q.No.1 (1)	Solvent Extraction is an Equilibrium Process and is controlled by : (A) Law of Mass Action (B) The amount of Solvent used (C) Distribution Law (D) The amount of Solute
(2)	The Volume occupied by 1 . 4 g of N_2 at S.T.P is : (A) 2 . 24 dm^3 (B) 22 . 4 dm^3 (C) 1 . 12 dm^3 (D) 112 cm^3
(3)	The mass of 1 Mole of Electron is : (A) 1 . 008 mg (B) 0 . 55 mg (C) 0 . 184 mg (D) 1 . 673 mg
(4)	The Comparative rate at which the solute moves in Paper Chromatography depends on : (A) The size of Paper (B) R_f values of solutes (C) Temperature of the experiment (D) Size of the Chromatographic tank used
(5)	In order to mention Boiling Point of Water at 110°C , the External Pressure should be : (A) Between 760 torr and 1200 torr (B) Between 200 torr and 760 torr (C) 765 torr (D) Any value of Pressure
(6)	A real gas obeying Van der Waals equation will resemble ideal gas if : (A) Both ' a ' and ' b ' are large (B) Both ' a ' and ' b ' are small (C) ' a ' is small and ' b ' is large (D) ' a ' is large and ' b ' is small
(7)	Pressure remaining constant , at which temperature , the volume of a gas will become twice of what it is at 0°C : (A) 546° C (B) 200° C (C) 546 K (D) 273 K
(8)	Ionic Solids are characterized by : (A) Low Boiling Point (B) Good Conductivity in Solid State (C) High Vapour Pressure (D) Solubility in Polar Solvents
(9)	The nature of Positive rays depend upon : (A) The Nature of the Electrode (B) The Nature of the Discharge Tube (C) The Nature of the residual Gas (D) All of the above
(10)	Which of the Hydrogen Halides has highest Percentage of Ionic Character : (A) HCl (B) HBr (C) HF (D) HI
(11)	The number of Bonds in Nitrogen Molecule : (A) One Sigma and One Pi (B) One Sigma and two Pi (C) Three Sigma only (D) Two Sigma and One Pi
(12)	Quantum number values for 2p Orbitals are : (A) $n = 2, \ell = 1$ (B) $n = 1, \ell = 2$ (C) $n = 1, \ell = 0$ (D) $n = 2, \ell = 0$
(13)	18 g glucose is dissolved in 90 g of H_2O . The relative lowering of Vapour Pressure is equal to : (A) $\frac{1}{5}$ (B) 5 . 1 (C) $\frac{1}{51}$ (D) 6
(14)	The pH of 10^{-3} mol dm^{-3} of an Aqueous Solution of H_2SO_4 is : (A) 3 (B) 2 . 7 (C) 2 . 0 (D) 1 . 5
(15)	If an endothermic reaction is allowed to take place very rapidly in the air , the temperature of the surrounding air : (A) Remains Constant (B) Increases (C) Remains Unchanged (D) Decreases
(16)	The Cathodic Reaction in the Electrolysis of dil . H_2SO_4 with Pt Electrode is : (A) Reduction (B) Oxidation (C) Both Oxidation and Reduction (D) Neither Oxidation nor Reduction
(17)	In Zero Order Reaction , the rate is independent of : (A) Temperature of Reaction (B) Concentration of Reactants (C) Concentration of Products (D) None of these

Roll No.	1531 - 1)22	Inter (Part - I)	
Chemistry (Subjective)	**Inter (Ist – A – Exam – 2024)**	**Group Ist**	Time 2 : 40 Hours Marks : 68

Note : It is compulsory to attempt any (8 – 8) Parts each from Q.No. 2, Q.No.3 and attempt any (6) Parts from Q.No.4. Attempt any (3) Questions from Part – II. Write same Question No. and its Part No. as given in the Question Paper.

Make Diagram where necessary. | **Part - I** | | 22 x 2 = 44

Q.No.2	(i)	Why some Elements have Atomic Masses in fraction?		
	(ii)	Define Pressure . Give Units of Pressure.		
	(iii)	Define Atomicity and Isotopy.	(iv)	Differentiate between Diffusion and Effusion.
	(v)	Why Sintered Glass Crucible is better than Gooch Crucible?	(vi)	Define Crystallization. Write down only two names of its steps.
	(vii)	What are two causes of deviation from Ideality of Gases?	(viii)	Write down major steps involved in Complete Quantitative Analysis.
	(ix)	How Partial Pressure of Dry Gas can be calculated by Dalton's Law of Partial Pressure?	(x)	How the value of K_C Predict the Extent of Reaction ? Give examples.
	(xi)	How would you maximize the yield of Ammonia in Haber 's Process ?	(xii)	Justify the effect of Catalyst on Equilibrium Constant.
Q.No.3	(i)	Why Boiling Point of Water is different at Murree Hills and Mount Everest?	(ii)	One feels sense of Cooling under the fan after bath. Why?
	(iii)	Define Allotropy. Give example	(iv)	Cleavage itself is an Isotropic behaviour why?
	(v)	State Pauli 's Exclusion Principle.	(vi)	Define ppm. Write Formula.
	(vii)	Why Boiling point of Solvent increases by adding Solute?	(viii)	Define Order of Reaction. Give example.
	(ix)	Write Electronic Configuration of Chromium (At. No . 24) .	(x)	What happens when the Neutron Decay?
	(xi)	The e/m of positive rays is less than Cathode Rays . Justify.	(xii)	A Catalyst is Specific in its action. Justify with example
Q.No.4	(i)	What is trend of Variation for Electron Affinity in the Periodic Table?		
	(ii)	Predict the Geometry of Molecule H_2O by VSEPR Theory.		
	(iii)	Why Sigma Bond is stronger than Pi Bond ?		
	(iv)	Define Dipole Moment and write its Unit.		
	(v)	Justify that $\triangle E = q_v$.		
	(vi)	Explain the term Enthalpy . Also write its formula.		
	(vii)	Define Enthalpy of Atomization with an example.		
	(viii)	Calculate Oxidation No. of Cr in $K_2Cr_2O_7$		
	(ix)	Lead Accumulator is a Chargeable Battery. Comment on it.		

(Part – II) | 3 x 8 = 24

Q.No.5	(a)	What are Isotopes ? Discuss Relative Abundance of Isotopes.	(4)
	(b)	Describe the given properties of Crystalline Solids : (i) Anisotropy (ii) Polymorphism	(4)
Q.No.6	(a)	There is a mixture of Hydrogen , Helium and Methane occupying a Vessel of Volume 13 dm^3 at 37 °C and Pressure of 1 atm . The Masses of H_2 and He are 0 . 8 g and 0 . 12 g respectively . Calculate the Partial Pressures in torr of each gas in the mixture .	(4)
	(b)	State and explain Heisenberg 's Uncertainty Principle .	(4)
Q.No.7	(a)	Explain effect of Bonding on following properties of Compounds : (i) Isomerism (ii) Reaction Kinetics	(4)
	(b)	$N_{2(g)}$ and $H_{2(g)}$ combine to give $NH_{3(g)}$. The value of K_c in this reaction at 500°C is 6 . 02 x 10^{-2} . Calculate the value of K_p for this Reaction.	(4)
Q.No.8	(a)	Define Internal Energy and Enthalpy. Prove $\triangle H = q_p$	(4)
	(b)	Define Electrochemical Series. Explain the following applications in detail : (i) Prediction of the Feasibility of a Chemical Reaction (ii) Calculation of emf of the Cell	(4)
Q.No.9	(a)	What are Continuous and Discontinuous Solubility Curves ? Give examples.	(4)
	(b)	What are Enzymes ? Give three Characteristics of Enzyme Catalysis.	(4)

Paper I	(Objective Type)	Inter (Ist – A – Exam 2024)	
Time :	20 Minutes	Inter (Part - I)	(Group 2nd)
Marks :	17	Session (2022 – 24) & (2023 – 25)	

Note : Four choices A , B , C ,D to each question are given. Which choice is correct fill that circle in front of that Question No. on the Objective Bubble Sheet. Use Marker or Pen to fill the circles. Cutting or filling two or more circles will result in Zero Mark in that Question.

Q.No.1	Number of Crucibles are :
(1)	(A) 2 (B) 3 (C) 4 (D) 5
(2)	Which of the following is Water absorber which is used in Combustion Analysis : (A) $MgCl_2$ (B) $Mg(ClO_4)_2$ (C) $MgBr_2$ (D) Mg_3N_2
(3)	One Mole of SO_2 contains : (A) 6.02×10^{23} Atoms of Oxygen (B) 18.1×10^{23} Molecules of SO_2 (C) 6.02×10^{23} Atoms of Sulphur (D) 4 Gram Atoms of SO_2
(4)	Common ways of Carrying out Paper Chromatography are : (A) 2 (B) 4 (C) 3 (D) 5
(5)	Atmospheric Pressure at Mount Everest is : (A) 123 torr (B) 223 torr (C) 323 torr (D) 423 torr
(6)	If Absolute temperature of a gas is doubled and pressure is reduced to one half , the volume of gas will be : (A) Remain Unchanged (B) Reduce to 1 / 4 (C) Increase Four Times (D) Be Doubled
(7)	Value of Absolute Zero is : (A) – 373 . 16°C (B) – 273 . 16°C (C) 273 . 16°C (D) 373 . 16°C
(8)	Which of the given is a Pseudo Solid : (A) CaF_2 (B) Glass (C) NaBr (D) NH_4Br
(9)	Which of the given Molecule has Linear Geometry : (A) $BeCl_2$ (B) H_2O (C) H_2S (D) $SnCl_2$
(10)	Quantum Number Values for 2p Orbitals are : (A) $n = 2 , \ell = 1$ (B) $n = 1 , \ell = 1$ (C) $n = 2 , \ell = 0$ (D) $n = 1 , \ell = 3$
(11)	When Cathode rays strike on Alumina then colour of glow is : (A) Green (B) Red (C) Blue (D) Orange
(12)	Bond Order of N_2 Molecule is : (A) 0 (B) 1 (C) 2 (D) 3
(13)	The pH of 10^{-3} mol dm^{-3} of aqueous solution of H_2SO_4 is : (A) 2 . 7 (B) 3 . 0 (C) 1 . 5 (D) 2 . 0
(14)	For Decomposition of Ozone , K_C at 25°C is : (A) 10^{55} (B) 10^{50} (C) 10^{53} (D) 10^{57}
(15)	For the Reaction : $NaOH + HCl \longrightarrow NaCl + H_2O$ the change in Enthalpy is called : (A) Heat of Reaction (B) Heat of Formation (C) Heat of Neutralization (D) Heat of Combustion
(16)	Electrolyte of Lead Accumulator is : (A) 30 % H_2SO_4 (B) 20 % HCl (C) 30 % HNO_3 (D) 5 % HI
(17)	Disintegration of radioactive $^{235}_{92}U$ has Half Life of : (A) 700 Million Years (B) 710 Million Years (C) 700 Billion Years (D) 710 Billion Years

Roll No. (Group 2nd)	1532- 15000	Inter (Part – I)	Session (2022 – 24) & (2023 – 25)
Chemistry (Subjective)	Inter (Ist – A – Exam – 2024)		Time 2 : 40 Hours Marks : 68

Note : It is compulsory to attempt any (8 – 8) Parts each from Q.No. 2, Q.No.3 and attempt any (6) Parts from Q.No.4. Attempt any (3) Questions from Part – II. Write same Question No. and its Part No. as given in the Question paper.

Make Diagram where necessary.

Part - I

22 x 2 = 44

Q.No.2	(i)	Calculate the Mass in grams of 2 . 74 Moles of $KMnO_4$.		
	(ii)	What are Molecular Ions ? How these can be generated ?		
	(iii)	When two moles (4 g) of Hydrogen are made to react with two moles (64 g) of Oxygen, which will be the Limiting Reactant ? Explain	(iv)	What is Fluted Filter Paper? Give its advantage over Ordinary Filter Paper Filtration.
	(v)	Differentiate between Adsorption and Partition Chromatography.	(vi)	Define Sublimation. Name any two substances that can be sublimed.
	(vii)	Define Pressure . Give Units of Pressure.	(viii)	Give any two applications of Plasma.
	(ix)	Helium Gas is Ideal at room temperature while $Cl_{2(g)}$ is Non-ideal . Explain it.	(x)	Calculate the pH of 1 . 0 mol dm^{-3} of H2X , which is only 50% dissociated.
	(xi)	Write down K_c Units for the following reaction : $4NH_3(g) + 5O_2(g) \rightleftharpoons 4NO(g) + 6H_2O(g)$	(xii)	Dissociation Constant for water is temperature dependent . Explain it.
Q.No.3	(i)	Define Allotropy. Give example	(ii)	The e/m value of positive rays is different for different gases used in gas discharge tube but those of electrons remain same . Why?
	(iii)	Why it is necessary to decrease the pressure in discharge tube to get Cathode rays?	(iv)	Diamond is hard and an Electrical Insulator. Justify.
	(v)	Transition temperature is shown by Elements having Allotropic forms and by Compounds showing Polymorphism. Why?	(vi)	Boiling Point of Branched Chain Alkanes are lower than corresponding Straight Chain Alkanes, why?
	(vii)	Why Ice floats on Water?	(viii)	How can de-Broglie equation be derived?
	(ix)	Why Concentration in terms of Molality is independent of temperature but Molarity depends?	(x)	Why do Boiling Points of Solvents increase due to presence of solute?
	(xi)	What is meant by Half-Life Period? Give one example.	(xii)	How does light affect the rate of a Chemical Reaction?
Q.No.4	(i)	Why Electron Affinity of Flourine is less than that of Chlorine?		
	(ii)	Write down names of factors affecting bond strength.		
	(iii)	Bond Distance is the Compromise distance between two Atoms. Explain with reason .		
	(iv)	How Electronegativity difference predict the nature of Bond?		
	(v)	Define the given terms : (i) Thermochemistry (ii) State Function		
	(vi)	Define the term Lattice Energy. Give example.		
	(vii)	Why it is necessary to mention the physical states of reactants and products in Thermochemical Reaction?		
	(viii)	Differentiate between Electronic Conduction and Electrolytic Conduction.		
	(ix)	How extraction of Na can be done by Electrolysis of Molten NaCl?		

(Part – II)

3 x 8 = 24

Q.No.5	(a)	What is Combustion Analysis? How the percentages of various elements present in an Organic Compound are determined?	(4)
	(b)	What are Liquid Crystals? Give their six uses in daily life.	(4)
Q.No.6	(a)	250 cm^3 of Hydrogen is Cooled from 127°C to –27 °C by maintaining the Pressure constant. Calculate the new Volume of the gas at low Temperature.	(4)
	(b)	Describe J.J Thomson's Experiment for the measurement of e/m value of electron with diagram.	(4)
Q.No.7	(a)	Describe Postulates of Valence Shell Electron Pair Repulsion Theory (VSEPR).	(4)
	(b)	Calculate the pH of a Buffer Solution in which 0 . 11 Molar Concentration of CH_3COONa and 0 . 09 Molar Acetic Acid Solutions are present. (K_a for CH_3COOH is 1 . 85 x 10^{-5})	(4)
Q.No.8	(a)	How Enthalpy of a reaction be measured by using Glass Calorimeter?	(4)
	(b)	What is Lead Accumulator ? Describe discharging of Lead Accumulator.	(4)
Q.No.9	(a)	How is depression in Freezing Point measured by Beckmann's Apparatus?	(4)
	(b)	How does the Arrhenius Equation help us to calculate Energy of Activation of a Reaction?	(4)

OBJECTIVE

NOTE: You have four choices for each objective type question as A , B , C and D . The choice which you think is correct, fill that circle in front of that question number. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero marks in that question.

QUESTION NO. 1 11th Class Chemistry Objective Paper Group 1 DG Khan Board 2024

1 For a reaction $NaOH + HCl \longrightarrow NaCl + H_2O$ the change in enthalpy is called :
(A) Heat of neutralization ● (B) Heat of reaction
(C) Heat of formation (D) Heat of combustion

2 An excess of silver nitrate is added to barium chloride solution and precipitates removed by filtration , what are the main ions in the filtrate ?
(A) Ba^{2+} and NO_3^- only (B) Ag^+ , Ba^{2+} and NO_3^- only ●
(C) Ag^+ and NO_3^- only (D) Ba^{2+}, NO_3^- and Cl^-

3 Which of the following solution has the highest boiling point ?
(A) 18 % solution of glucose (B) 6.0 % solution of urea
(C) 5.85 % solution of sodium chloride ● (D) All have the same boiling point

4 If a strip of Cu metal is placed in a solution of $FeSO_4$:
(A) Cu will be deposited (B) Fe is precipitated out ●
(C) Cu and Fe both dissolved (D) No reaction takes place

5 With increase of 10 °C temperature the rate of reaction doubles. This increase in rate of reaction is due to:
(A) Increase in number of effective collisions. (B) Increase in activation energy of reactants.
(C) Decrease in activation energy of reaction.
(D) Decrease in the number of collisions between reactant molecules.

6 One mole of SO_2 contains :
(A) 6.02×10^{23} atoms of oxygen (B) 6.02×10^{23} atoms of sulphur ●
(C) 18.1×10^{23} molecules of SO_2 (D) 4 gram atoms of SO_2

7 How many particles are called fundamental particles of an atom ?
(A) 3 ● (B) 5 (C) 100 (D) 6

8 What are the units of R_f value ?
(A) Cm (B) Cm^3 (C) dm^3 (D) No units ●

9 Which of the following cannot sublime ?
(A) Naphthalene (B) Iodine (C) Ammonium chloride (D) MnO_2 ●

10 If absolute temperature of a gas is doubled and the pressure is reduced to one half , the volume of the gas will
(A) Be doubled (B) Reduced 1/4 (C) Increases four times ● (D) Remain unchanged

11 Partial pressure of oxygen in lungs (in torr) is :
(A) 150 (B) 116 ● (C) 760 (D) 159

12 Molecules of CO_2 in dry ice form the :
(A) Molecular crystals ● (B) Ionic crystals (C) Covalent crystals (D) Any type of crystals

13 Vapour pressure is not affected by :
(A) Temperature (B) Intermolecular forces (C) Surface area ● (D) Pressure

14 Wave number of the light emitted by a certain source is $2 \times 10^6\ m^{-1}$. The wavelength of this light will be :
(A) 500 n.m ● (B) 500 m (C) 200 n.m (D) 5×10^7 m

15 Radioactive copper emits :
(A) α - rays (B) β - rays ● (C) γ - rays (D) Positive rays

16 Which of the following molecules have zero dipole moment ?
(A) NH_3 (B) $CHCl_3$ (C) BF_3 ● (D) H_2O

17 The bond order of helium molecule is :
(A) 3 (B) 2 (C) 1 (D) Zero ●

SECTION–I

QUESTION NO. 2 Write short answers to any Eight (8) of the following 16

i	N_2 and CO have the same number of electrons, protons and neutrons, justify.
ii	Law of conservation of mass have to be obeyed during stoichiometric calculations, explain.
iii	Why actual yield is always less than theoretical yield ?
iv	Write two suitable uses of the technique of chromatography
v	In solvent extraction technique, why repeated extractions using small portions of solvent are more efficient than using a single extraction but larger volume of solvent.
vi	How undesirable colours in crystallization process can be removed ?
vii	Write formulas to interconvert various scales of temperature.
viii	How density of an ideal gas can be calculated from ideal gas equation ?
ix	Derive Charle's law by kinetic equation of gases.
x	What is Handerson equation and for what purpose it is used ?
xi	What are applications of buffer solutions in daily life ?
xii	Derive ionic product of water and what is its value at $25^{o}C$.

QUESTION NO. 3 Write short answers to any Eight (8) of the following 16

i	Why intermolecular forces are weaker than intramolecular forces ?
ii	What are advantages of Vacuum distillation ?
iii	Differentiate between Isomorphism and polymorphism.
iv	Diamond is hard and electrical insulator. Justify it.
v	Explain Atomic Emission Spectrum.
vi	Define (a) Wave number (b) Frequency
vii	Write electronic configuration of Cr_{24} and Zn_{30}
viii	What is Moseley's law ? Give its mathematical expression.
ix	What do you mean by water of crystallization ? Give an example.
x	Why NaCl and KNO_3 are used to lower the melting point of ice ?
xi	Differentiate between instantaneous and average rate of a reaction.
xii	What do you mean by Homogeneous catalysis ? Give an example.

QUESTION NO. 4 Write short answers to any Six (6) of the following 12

i	How does the hybridization scheme explain the bond length ?
ii	Define electron affinity. Name the factors affecting it.
iii	The radius of an atom cannot be determined precisely. Give the reason.
iv	Why do the lone pairs of electrons on an atom occupy more space than bond pairs ?
v	Define standard enthalpy of formation. Give an example.
vi	Define exothermic reaction. Give an example.
vii	Differentiate between spontaneous and non-spontaneous process.
viii	What is anodized aluminium ?
ix	Give the electrode reactions during the recharging of lead accumulator.

SECTION-II

Note: Attempt any Three questions from this section 8 x 3 = 24

Q.5.(A)	Define limiting reactant , write down the steps involved in identification of limiting reactant.	1+3
(B)	Define hydrogen bonding , how does it explain structure of ice (without diagram).	1+3
Q.6.(A)	Write a note on " Principal Quantum Number "	4
(B)	250 Cm^3 of the sample of hydrogen gas effuses four times as rapidly as 250 Cm^3 of an unknown gas. Calculate the molar mass of unknown gas.	4
Q.7.(A)	Discuss sp – hybridization with example of ethyne.	1+3
(B)	The solubility product of Ag_2CrO_4 is 2.6×10^{-2} at $25^{o}C$. Calculate the solubility of the compound.	4
Q.8.(A)	Describe construction and working of a Bomb Calorimeter.	4
(B)	What is standard electrode potential ? How can it be measured ?	4
Q.9.(A)	What are continuous and discontinuous solubility curves ? Draw these curves to explain the answer.	2+2
(B)	Discuss homogeneous and heterogeneous catalysis in detail with two examples of each.	2+2

OBJECTIVE

NOTE: You have four choices for each objective type question as A , B , C and D . The choice which you think is correct, fill that circle in front of that question number. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero marks in that question.

QUESTION NO. 1 11th Class Chemistry Objective Paper Group 2 DG Khan Board 2024

1 The order of rate of diffusion of gases NH_3 , SO_2 , Cl_2 and CO_2 is
(A) $NH_3 > SO_2 > Cl_2 > CO_2$ (B) ● $NH_3 > CO_2 > SO_2 > Cl_2$ (C) $Cl_2 > SO_2 > CO_2 > NH_3$ (D) $NH_3 > CO_2 > Cl_2 > SO_2$

2 Partial pressure of oxygen in lungs is :
(A) 760 torr (B) 320 torr (C) 159 torr (D) 116 torr ●

3 Which of the following is a Pseudo solid ?
(A) CaF_2 (B) Glass ● (C) NaCl (D) KCl

4 The number of Na ions which surround each Cl^- ion in the NaCl crystal is :
(A) 4 (B) 6 ● (C) 8 (D) 12

5 The e/m value for the positive rays is maximum for :
(A) H_2 ● (B) H_e (C) O_2 (D) N_2

6 The number of neutrons present in $_{19}K^{39}$ is :
(A) 18 (B) 19 (C) 20 ● (D) 39

7 Which of the following has zero dipole moment ?
(A) NH_3 (B) $CHCl_3$ (C) H_2O (D) CO_2 ●

8 In Al_2O_3 , the ratio between the ions is :
(A) 1 : 2 (B) 2 : 1 (C) 2 : 3 ● (D) 3 : 2

9 Calorie is equivalent to :
(A) 0.4184 J (B) 41.84 J (C) 4.184 J ● (D) 418.4 J

10 The pH of human blood is :
(A) 7.0 (B) 7.35 ● (C) 4.0 (D) 6.5

11 In a mixture of 7 g of N_2 and 8 g of O_2 , the mole fraction of O_2 is
(A) 1 (B) 0.1 (C) 0.5 ● (D) 0.2

12 The cell in which electrical energy is converted into chemical energy is called :
(A) Galvanic cell (B) Electrolytic cell ●
(C) Fuel cell (D) Deniel cell

13 Indicate the enzyme which catalyzes the $C_6H_{12}O_6 \longrightarrow 2C_2H_5OH + 2CO_2$:
(A) Diastase (B) Zymase (C) Urease (D) Invertase

14 18 g of H_2O sample has :
(A) 1 mole of H - atom (B) 0.5 mole of O - atom
(C) 6.22×10^{23} moles of H_2O (D) 6.02×10^{23} molecules of H_2O ●

15 The percentage of nitrogen in ammonia is :
(A) (14/34) x 100 (B) (14/17) x 100 ● (C) (3/17) x 100 (D) (28/38) x 100

16 Which one of the following does not undergo sublimation :
(A) $KMnO_4$ ● (B) Naphthalene (C) NH_4Cl (D) Iodine

17 The comparative rates at which the solutes move in paper chromatography depend on :
(A) Size of paper (B) R_f value of solute ●
(C) Temperature of the experiment (D) Size of the chromatographic tank used

CHEMISTRY		TIME: 2 HRS 40 MINUTES
GROUP : SECOND	SUBJECTIVE PART	MARKS: 68

SECTION-I

QUESTION NO. 2 Write short answers to any Eight (8) of the following **16**

i	Process of cation formation is endothermic. Justify.
ii	What are homoatomic and heteroatomic molecules ? Give one example of each.
iii	Why actual yield is always less than theoratical yield ?
iv	How rate of filtration can be increased ?
v	What is safe and reliable method for drying the crystals ?
vi	Give two characteristics of ideal solvent used for crystallization.
vii	Define isotherm. What is the effect of temperature on isotherm ?
viii	What is quantitative definition of Charle's law ? Give its mathematical form.
ix	Define critical temperature. On which factor does it depends
x	Define pH and pOH. Give its mathematical form.
xi	Define common ion effect. Give one example.
xii	What are acidic and basic buffers. Give one example of each.

QUESTION NO. 3 Write short answers to any Eight (8) of the following **16**

i	Define Lattice energy. Give example.
ii	Why transition temperature is shown by elements having allotropic forms and by compounds showing polymorphism. Give example.
iii	Iodine dissolves readily in Tetrachloromethan. Give reason.
iv	Water and ethanol can mix easily and in all proportions. Give reason.
v	Prove that $E = h c \bar{\nu}$
vi	Complete (or) write balanced equation for two Nuclear reactions. (a) $^{4}_{2}He + {}^{9}_{4}Be \longrightarrow$? (b) $^{14}_{7}N + {}^{1}_{0}n \longrightarrow$?
vii	Why is it necessary to decrease the pressure in the discharge tube to get the cathode rays ?
viii	How neutrons are used in the treatment of Cancer ?
ix	One molal solution of urea in water is dilute as compared to one molar solution of urea, but the number of particles of the solute is same. Justify.
x	Differentiate between ideal and non-ideal solutions.
xi	The rate of a chemical reaction is an ever changing parameter under the given conditions. Give reason.
xii	What is Pseudo first order reaction ?

QUESTION NO. 4 Write short answers to any Six (6) of the following **12**

i	Dipole moment of CO_2 is zero , but that of SO_2 is 1.61 D why ?
ii	Anionic radius is more than its parent atom why ?
iii	Draw geometry of $BeCl_2$ molecule on the basis of VSEPR theory.
iv	Define covalent radius. Give one example.
v	Define thermochemistry.
vi	State standard enthalpy of solution. Give example.
vii	Define internal energy.
viii	Draw diagram of voltaic cell.
ix	Define electrochemistry.

SECTION-II

Note: Attempt any Three questions from this section **8 x 3 = 24**

Q.5.(A)	What is stoichiometry ? Give its assumptions. Mention two laws which help to perform the stoichiometric calculation	1+2+1
(B)	Define vapour pressure of liquids. Also explain manometric method for its determination.	1+3
Q.6.(A)	Calculate the density of CH_4 (g) at 0 °C and 1 atmospheric pressure.	4
(B)	Describe Millikan's oil drop method to measure the charge on electron.	4
Q.7.(A)	. Write down the four postulates of VSEPR theory.	4
(B)	N_2 (g) and H_2 (g) combine to give NH_3 (g). The value of K_c in this reaction at 500 °C is 6.0×10^{-2}. Calculate the value of K_p for this reaction.	4
Q.8.(A)	Define the following with examples. (i) Enthalphy (ii) Exothermic reaction (iii) Boundary (iv) Enthalpy of atomization	4
(B)	Write any four industrial importance of electrolytic process.	4
Q.9.(A)	Derive a relationship for $M_2 = \frac{K_b}{\Delta T_b} \cdot \frac{1000 W_2}{W_1}$	4
(B)	What do you the mean by the term " order of reaction " ? Explain by giving any three suitable examples.	1+3

☆	Roll No _____	HSSC-(P-I)-A/2024 (For All Sessions)	Paper Code	6	4	8	1

Chemistry (Objective)

(Group-I)

Time: 2υ Minutes **Marks : 17**

Note: Write Answers to the Questions on the objective answer sheet provided. Four possible answers A, B, C and D to each question are given. Which answer you consider correct, fill the corresponding circle A, B, C or D given in front of each question with Marker or Pen ink on the answer sheet provided.

1.1 The mass of one mole of electron is:

(A) 1.008 mg (B) ● 0.55 mg (C) 0.184 mg (D) 1.673 mg

2. In organic phase color of Iodine is:

(A) Brown (B) ● Purple (C) Colorless (D) Green

3. Pressure remaining constant at which temp. The volume of a gas will become twice of it is at 0°C:

(A) 546°C (B) 200°C (C) ● 546 k (D) 273 k

4. Ionic crystals are characterized by:

(A) ● Solubility in polar solvents (B) Low melting point (C) High vapour pressure (D) Conductivity in solid state

5. Number of crystal systems are:

(A) ● 7 (B) 6 (C) 5 (D) 4

6. When 6 d orbital is complete, the entering electron goes to.

(A) 7f (B) 7s (C) ● 7p (D) 7d

7. Dipole moment of CS_2 is:

(A) 3.2D (B) 2.2D (C) 1.3D (D) ● Zero Debye

8. The net heat change in a chemical reaction is same whether it is brought about in two or more different ways in one or more than one steps, it's known as:

(A) Henry's law (B) Joul's principle (C) ● Hess's law (D) Law of conservation of energy

9. Which of the following solution have P_H less than 7?

(A) $NaOH$ (B) $NaCl$ (C) $Ca(OH)_2$ (D) ● HCl

10. The boiling point constant is the ratio of the elevation in boiling point to:

(A) Molarity (B) Mole fraction of solvent (C) ● Molality (D) Mole fraction of solute

11. Cathode reaction in the electrolysis of dil H_2SO_4 with Pt electrodes is:

(A) Oxidation (B) ● Reduction (C) Both oxidation & reduction (D) Neither oxidation nor reduction

12. The unit of rate constant is the same as that of the rate of reaction in:

(A) First order reaction (B) Second order reaction (C) Third order reaction (D) ● Zero order reaction

13. Number of isotopes of tin are:

(A) 8 (B) 10 (C) 6 (D) ● 11

14. Which of the following is sublime?

(A) ● Iodine (B) Calcium (C) $NaCl$ (D) Benzene

15. S.I unit of pressure is:

(A) ● $N.m^{-1}$ (B) Torr (C) mm of Hg (D) Psi

16. Positive rays are also called as:

(A) Cathode rays (B) ● Canal rays (C) X-rays (D) Magnetic rays

17. Octet rule is not obeyed by the molecule:

(A) NF_3 (B) CF_4 (C) ● PF_5 (D) CO_2

Roll No _____

HSSC-(P-I)-A-2024
(For All Sessions)

Marks : 68

Chemistry (Subjective)

(GROUP-I)

Time: 2:40 hours

SECTION-I

2. Write short answers of any eight parts from the following: (8x2=16)

i. Define gram ion. Give two examples.
ii. One mole of H_2SO_4 should completely react with two moles of $NaOH$. How does Avogadro's number help to explain it?
iii. Give any four methods for the separation of isotopes.
iv. What is sintered glass crucible? Give its significance.
v. What is crystallization? Give its basic principle.
vi. What is chromatogram? Give an example.
vii. Derive Avogadro's law from kinetic molecular theory of gases.
viii. Give two characteristics of plasma.
ix. What is the effect of pressure and temperature on the density of an ideal gas?
x. Why is HCl added before passing H_2S gas for the detection of second group basic radicals during salt analysis?
xi. What is the effect of rise in temperature on the solubility of KI in water?
xii. What are buffer solutions? Give their two applications.

3. Write short answers of any eight parts from the following: (8x2=16)

i. Why HF is weaker acid than other hydrogen halids?
ii. Define dipole-diploe forces of attraction with example.
iii. Why lower alcohols are soluble in water?
iv. Define crystal lattice and unit cell.
v. Why it is necessary to decrease pressure in discharge tube to get cathode rays?
vi. What is origin of line spectrum?
vii. Define stark effect.
viii. Discuss Pauli exclusion principle.
ix. Why aqueous solution of NH_4Cl is acidic in nature?
x. Define solubility with two examples.
xi. Radioactive decay is always first order reaction. Justify.
xii. Rate of reaction decreases with passage of time. Explain.

4. Write short answers of any six parts from the following: (6x2=12)

i. Potassium can displace hydrogen from acids but copper cannot. Explain by giving reason.
ii. Calculate the oxidation number of underlined elements : $H\underline{P}O_3$, $\underline{Cr}O_3$
iii. Differentiate between system and surrounding by giving example.
iv. Define enthalpy of combustion by giving suitable example.
v. What do you mean by internal energy? Briefly explain.
vi. The bond angle of H_2O is not 109.5° like that of CH_4. Although 'O' and 'C' are both sp^3 hybridized. Explain with reason.
vii. π-bonds are more diffused than σ-bonds. Explain with reason.
viii. The heat of vapourization of electrovalent compounds are higher than covalent compounds. Explain with reason.
ix. Write down basic assumption of VSEPR-theory.

SECTION-II

Note **Attempt any three questions. Each question carries equal marks:** (8x3=24)

5. (a) Define following terms: (i) Atom (ii) Isotope (iii) Empirical formula (iv) Molecular formula. (4)
(b) Give four (04) applications of liquid crystals. (4)
6. (a) Calculate the density of CH_4 gas at $0°C$ and 1 atm. What will happen to the density if temperature is increased to 27°C (2+2)
(b) Explain azimuthal quantum number in detail. (4)
7. (a) Define ionization energy. How does it vary in the periodic table? What factors are responsible for their variations? (4)
(b) The solubility product of Ag_2CrO_4 is 2.6×10^{-2} at 25°C. Calculate the solubility of the compound. (4)
8. (a) Explain how enthalpy of a reaction can be measured by Bomb Calorimeter? Draw diagram also. (3+1)
(b) How electrode potential of Zn can be measured? Draw diagram also. (3+1)
9. (a) Define elevation of boiling point and describe Landsberger's method for measurement of boiling point elevation. (4)
(b) Define catalysis. Explain its types with suitable examples. (1+3)

838-11-A

☆☆ Roll No _____	HSSC-(P-I)-A/2024 (For All Sessions)	Paper Code	6	4	8	4

Chemistry (Objective)

(Group-II) **Time: 20 Minutes** **Marks : 17**

Note: Write Answers to the Questions on the objective answer sheet provided. Four possible answers A, B, C and D to each question are given. Which answer you consider correct, fill the corresponding circle A, B, C or D given in front of each question with Marker or Pen ink on the answer sheet provided.

1.1 Mixture of NH_4OH and NH_4Cl is one of the best example of:
(A) Acidic buffer (B) ● Basic buffer (C) Common Ion effect (D) Solubility product

2. Molarity of pure water is:
(A) 1 (B) 18 (C) ● 55.5 (D) 6

3. Stronger the oxidizing agent, greater is the:
(A) Oxidation potential (B) ● Reduction potential (C) Redox potential (D) E.M.F. of cell

4. The process in which catalyst and reactant are in different phases is called:
(A) Homogeneous catalysis (B) ● Heterogeneous catalysis (C) Autocatalysis (D) Negative catalysis

5. The efficiency of a reaction can be checked by calculating its:
(A) Theoretical yield (B) Actual yield (C) ● Percentage yield (D) Mass

6. The mass of one mole of electrons is:
(A) 1.008 mg (B) ● 0.55 mg (C) 0.184 mg (D) 1.673 mg

7. A safe and reliable method for drying the crystals is by using:
(A) ● Vacuum desiccators (B) Oven (C) Filter paper (D) Spreading the crystals in open air

8. Chromatography in which stationary phase is liquid is classified as:
(A) Thin layer chromatography (B) Gas chromatography (C) Adsorption chromatography (D) ● Partition chromatography

9. The partial pressure of oxygen in lungs is:
(A) 159 torr (B) ● 116 torr (C) 1160 torr (D) 1590 torr

10. Smell of the cooking gas during leakage from a gas cylinder is due to the process of:
(A) Osmosis (B) Diffusion ● (C) Effusion (D) Evaporation

11. When water freezes at 0°C, its density decreases due to:
(A) Cubic structure of ice (B) ● Empty spaces present in the structure of ice
(C) Change of bond lengths (D) Change of bond angles

12. Ice and sugar are the best examples of:
(A) Ionic solids (B) Covalent solids (C) ● Molecular solids (D) Metallic solids

13. The name of proton was suggested by:
(A) Bohr (B) J.J Thomson (C) ● Rutherford (D) Stoney

14. When 6d orbital is complete, the entering electron goes into:
(A) 7f (B) 7s (C) ● 7p (D) 7d

15. The covalent radius of hydrogen is:
(A) 176.7 pm (B) ● 37.7 pm (C) 75.4 pm (D) 77.3 pm

16. Which of the following molecule has zero dipole moment?
(A) NH_3 (B) $CHCl_3$ (C) H_2O (D) ● BF_3

17. The product of mass and specific heat of water is called:
(A) ● Heat capacity (B) Enthalpy of reaction (C) Heat of a reaction (D) Buffer capacity

839-11-A

Roll No _____

HSSC-(P-I)-A-2024
(For All Sessions)

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Marks : 68

Chemistry (Subjective)

(GROUP-II)

Time: 2:40 hours

SECTION-I

2. Write short answers of any eight parts from the following: (8x2=16)

i. Molecular formula is multiple of empirical formula. Give an example.
ii. Define gram formula. Give an example.
iii. Many chemical reactions taking place in our surrounding involve the limiting reactants. Give the reason.
iv. Give two methods for drying of the crystallized substance.
v. What is ether extraction? Give its importance.
vi. How does a Gouch crucible increase the rate of filtration?
vii. What is plasma? How is it formed?
viii. Calculate the value of R in SI units.
ix. Derive Boyle's law from kinetic molecular theory of gases.
x. How can we prepare basic buffers? Give an example.
xi. Define solubility product. Give an example.
xii. How does the equilibrium constant of a reaction tell us about the direction of a chemical reaction?

3. Write short answers of any eight parts from the following: (8x2=16)

i. Why ionic crystals do no conduct electricity in solid state but their aqueous solutions are good conductors?
ii. Why one feels sense of cooling under the fan after bath?
iii. Why ethane (C_2H_6) has lower boiling point than hexane (C_6H_{14})?
iv. Why lower alcohols are water soluble but hydrocarbons are water insoluble?
v. Calculate wave number for first spectral line of Lyman series.
vi. Define Hund's rule, give an example.
vii. Write electronic configuration of Cu_{29} and I_{53}.
viii. Differentiate between orbit and orbitals.
ix. Justify that sum of all mole fractions is equal to unity for any solution.
x. Freezing points of solvents are depressed due to presence of solutes in solutions.
xi. Justify that radioactive decay is always a first order reaction.
xii. A catalyst is specific in its function, prove it by chemical reactions.

4. Write short answers of any six parts from the following: (6x2=12)

i. Na metal can displace hydrogen from acids but 'Pt' and 'Pd' cannot. Explain by giving reason.
ii. Calculate the oxidation number of underlined elements: $H\underline{N}O_3$; $\underline{Cr}O_3$
iii. Define enthalpy of neutralization by giving one such example.
iv. A reaction may be endothermic and spontaneous. Explain by giving example.
v. Prove that $\Delta E = q_v$
vi. The distinction between coordinate covalent bond and a covalent bond vanishes after the bond formation in $CH_3\overset{+}{N}H_3$. Explain by giving reason.
vii. The abnormality of bond length and bond strength in HI is less prominent than that of HCl. Explain with reason.
viii. Calculate the bond energy of H-Br. The bond energy of H-H is 436 KJ mol^{-1} and that of Br-Br is 193 KJ mol^{-1}
ix. Give any two limitations of Lewis concept of chemical bonding.

SECTION-II

Note **Attempt any three questions. Each question carries equal marks:** (8x3=24)

5. (a) What are limiting reactants and how is limiting reactant identified. (4)
(b) Discuss manometric method for measurement of vapour pressure. (4)

6. (a) Calculate the mass of 1 dm^3 of NH_3 gas at 30°C and 1000 torr pressure, considering that NH_3 is behaving ideally. (4)
(b) Describe eight (08) characteristics of cathode rays. (4)

7. (a) Define sp^3 hybridization . Explain the shape of methane molecule. (1+3)
(b) Calculate the P_H of buffer solution in which 0.11 molar CH_3COONa and 0.09 molar CH_3COOH solution are present. Ka for CH_3COOH is 1.85×10^{-5} (4)

8. (a) Explain how enthalpy of a reaction is determined by glass calorimeter. Also draw diagram. (3+1)
(b) Explain construction and working of standard hydrogen electrode. (4)

9. (a) Define the following terms: (i) Molarity (ii) Molality (iii) Mole Fraction (iv) Parts per million (ppm) (1x4)
(b) Define activation energy. How does the Arrhenius equation help us to calculate energy of activation of reaction. (4)

840-11-A

1124 **Warning:- Please write your Roll No. in the space provided and sign** **Roll No----------**

(Inter Part – I) **(Session 2020-22 to 2023-25)** **Sig. of Student ----------**

Chemistry (Objective) **(Group - I)** **Paper (I)**

Time Allowed:- 20 minutes **PAPER CODE 2485** Maximum Marks:- 17

Note:- You have four choices for each objective type question as A, B, C and D. The choice which you think is correct; fill that circle in front of that question number. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero mark in that question. Write **PAPER CODE, which is printed on this question paper**, on the both sides of the Answer Sheet and fill bubbles accordingly, otherwise the student will be responsible for the situation. Use of Ink Remover or white correcting fluid is not allowed.

Q. 1

1) The Cathodic reaction in the electrolysis of dil. H_2SO_4 with Pt electrode is
(A) Reduction ● (B) Oxidation (C) Both reduction and Oxidation (D) Neither oxidation nor reduction

2) Catalyst for a catalyst is also called
(A) Promotor ● (B) Inhibitor (C) Poisoning (D) Retarder

3) 27 g of $A\ell$ will react completely with how much mass of O_2 to produce $A\ell_2O_3$
(A) 8 gm of oxygen (B) 16 gm of oxygen (C) 32 gm of oxygen (D) 24 gm of oxygen ●

4) The mass of one mole of electron is
(A) 1.008 mg (B) 0.55 mg ● (C) 0.184 mg (D) 1.673 mg

5) The comparative rates at which the solute moves in paper chromatography, depends on
(A) The size of paper (B) R_f values of solute ● (C) Temperature of the experiment (D) Size of chromatographic tank used

6) During the process of crystallization, the hot saturated solution
(A) Is cooled very slowly to get large size crystals (B) Is cooled at a moderate rate to get medium sized crystals ● (C) Is evaporated to get the crystals of the product (D) Is mixed with an immiscible liquid

7) The molar volume of CO_2 is maximum at
(A) STP (B) 127°C and 1atm ● (C) 0°C and 2atm (D) 273°C and 2atm

8) Which of the following will have same number of molecules at STP
(A) 280 cm^3 of CO_2 and 280 cm^3 of N_2O ● (B) 11.2 dm^3 of O_2 and 32g of O_2 (C) 44g of CO_2 and 11.2 dm^3 of CO_2 (D) 28g of N_2 and 5.6 dm^3 of oxygen

9) Acetone and chloroform are soluble into each other due to
(A) Intermolecular hydrogen bonding ● (B) Ion dipole interaction (C) Instantaneous dipole (D) Hydrolysis

10) Which of the following pair do not show isomorphism
(A) $NaNO_3$, KNO_3 (B) $ZnSO_4$, $NiSO_4$ (C) Cu , Ag (D) NaCl , $CuCl_2$ ●

11) Which of the following sub-atomic particle do not show ionization
(A) Electron (B) Proton (C) Neutron ● (D) Alpha ray

12) When 6d orbital is complete, the entering electron goes into
(A) 7f (B) 7s (C) 7p ● (D) 7d

13) The type of hybridization in molecule of ethene ($CH_2 = CH_2$) is
(A) sp (B) sp^3 (C) sp^2 ● (D) dsp

14) Which of the following compounds possess ionic bonding
(A) CaO ● (B) CH_4 (C) CH_3Cl (D) C_2H_6

15) The change in heat energy of a chemical reaction at a constant temperature and pressure is called
(A) Enthalpy change ● (B) Bond energy (C) Heat of sublimation (D) Internal energy

16) For which system, does the equilibrium constant (K_c) has units of $(Concentration)^{-1}$
(A) $N_2 + 3H_2 \rightleftharpoons 2NH_3$ (B) $H_2 + I_2 \rightleftharpoons 2HI$ (C) $2NO_2 \rightleftharpoons N_2O_4$ ● (D) $2HF \rightleftharpoons H_2 + F_2$

17) Colligative properties are the properties of
(A) Dilute solutions which behaves as nearly ideal solutions ● (B) Concentrated solutions which behaves as nearly non-ideal solutions (C) Both A and B (D) Neither A nor B

1124 (Inter Part - I) **Warning**:- Please, do not write anything on this question paper except your **Roll No.**

Chemistry (Subjective) **(Session 2020-22 to 2023-25) Group (I) Paper (I)**

Time Allowed: 2.40 hours **Section ---------- I** **Maximum Marks: 68**

2. Answer briefly any Eight parts from the followings:- **8 × 2 = 16**

(i) Calculate percentage of phosphorus and Nitrogen in $(NH_4)_2HPO_4$

(ii) 10g of Magnesium and 5g of Carbon have equal number of atoms. Justify.

(iii) Define Stoichiometry. Give its basic conditions.

(iv) Differentiate between Qualitative and Quantitative analysis.

(v) Write down method to separate iodine from its aqueous solution.

(vi) How cooling can be done for Crystallization? (Any two methods)

(vii) Water vapours don't behave ideally at 273 K . Explain with reason.

(viii) Calculate the value of "R" in ideal gas equation. (Any units)

(ix) Give characteristics of Plasma. **(x)** Calculate the pH of 10^{-4}mol.dm^{-3} of $Ba(OH)_2$

(xi) Write down K_c units for the following reaction $PCl_{5\,(g)} \rightleftharpoons PCl_{3\,(g)} + Cl_{2\,(g)}$

(xii) Explain that a Mixture of NH_4OH and NH_4Cl gives us a basic buffer.

3. Answer briefly any Eight parts from the followings:- **8 × 2 = 16**

(i) Why diamond is hard and electrical insulator.

(ii) Heat of sublimation of substance is greater than it's heat of vaporization, give it's reason.

(iii) What are Debye forces. **(iv)** What is effect of temperature and surface area on evaporation.

(v) Calculate mass of electron from it's charge and e/m value.

(vi) How does neutron interact with $^{14}_{7}N$ and $^{65}_{29}Cu$

(vii) e/m value of positive rays depends on nature of gas which is used in discharge tube, explain it.

(viii) Differentiate between Zeeman effect and Stark effect.

(ix) Differentiate between molarity and molality. **(x)** Justify that aqueous solution of NaCl is neutral.

(xi) What is catalytical poisoning. **(xii)** Differentiate between homogenous catalysis and heterogenous catalysis.

4. Answer briefly any Six parts from the followings:- **6 × 2 = 12**

(i) Write down the cause of chemical combination. **(ii)** Why atoms have no sharp boundary?

(iii) Why lone pair of electrons occupies more space than a bond pair?

(iv) Bond angle in NF_3 shrinks to 102° why? **(v)** What is meant by internal energy?

(vi) Define standard enthalpy of formation. Give example.

(vii) Define standard enthalpy of reaction. Give example.

(viii) Calculate oxidation number of Cr in Cr_2O_3.

(ix) A porous plate or a salt bridge is not required in lead storage cell. Why?

Section -------- II

Note: Attempt any three questions. **(8 × 3 = 24)**

5. (a) What is Stoichiometry? Give its assumptions? Mention two important Laws, which help to perform the Stoichiometric calculations?

(b) Define ionic solids. Discuss Any six properties of ionic solids in detail.

6. (a) A sample of Krypton with a volume of 6.25 dm^3, a pressure of 765 torr and a temperature of 20 °C is expanded to a volume of 9.55 dm^3 and a pressure of 375 torr. What will be its final temperature in °C

(b) Explain Millikan's oil drop experiment to determine the charge of an electron.

7. (a) Discuss sp^2-hybridization with example of ethene.

(b) Calculate the pH of a buffer solution in which 0.11 molar CH_3COONa and 0.09 molar acetic acid solution are present. K_a for CH_3COOH is 1.85×10^{-5}

8. (a) Define Hess's law of constant heat summation. How the enthalpy of formation of CO can be calculated with it.

(b) Describe fuel cell in detail with diagram.

9. (a) Explain the terms Molarity and Molality with their formulas.

(b) Write four characteristics of Enzyme catalysis.

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1124 Warning:- Please write your Roll No. in the space provided and sign.Roll No----------

(Inter Part – I) (Session 2020-22 to 2023-25) Sig. of Student ----------

Chemistry (Objective) (Group - II) Paper (I)

Time Allowed:- 20 minutes **PAPER CODE 2488** **Maximum Marks:- 17**

Note:- You have four choices for each objective type question as A, B, C and D. The choice which you think is correct; fill that circle in front of that question number. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero mark in that question. Write **PAPER CODE, which is printed on this question paper**, on the both sides of the Answer Sheet and fill bubbles accordingly, otherwise the student will be responsible for the situation. Use of Ink Remover or white correcting fluid is not allowed.

1) The molal boiling point constant is the ratio of the elevation in boiling point to
(A) Molarity (B) Molality ● (C) Mole fraction of solvent (D) Mole fraction of solute

2) During a redox reaction, an oxidizing agent
(A) gains electrons ● (B) is oxidized (C) loses electrons (D) Is hydrolyzed

3) If the rate equation of a reaction $2A + B \longrightarrow$ Products is Rate = K[A][B], and A is present in large excess, then order of reaction is
(A) 2.5 (B) 3 (C) 1.5 (D) 1 ●

4) One dm^3 of N_2 at S.T.P contains about
(A) 5.37×10^{22} atoms (B) 3.01×10^{23} atoms (C) 6.02×10^{23} atoms (D) 2.68×10^{19} atoms ●

5) The number of moles of CO_2 which contain 8.0g of oxygen is
(A) 0.25 ● (B) 0.50 (C) 1.0 (D) 1.50

6) The molar volume of CO_2 is maximum at
(A) STP (B) 127°C and 1atm ● (C) 0°C and 2atm (D) 273°C and 2atm

7) A real gas obeying Vander Waals equation will resemble ideal gas if
(A) Both 'a' and 'b' are large (B) 'a' is small and 'b' is large (C) 'a' is large and 'b' is small (D) Both 'a' and 'b' are small ●

8) The comparative rates at which the solutes move in paper chromatography depend on
(A) The size of paper (B) Temperature of the experiment (C) R_f values of solutes ● (D) Size of the chromatographic tank used

9) In the presence of KI, iodine dissolves in water due to formation of
(A) I_2 (B) $I_3^{\ominus}$ ● (C) $I^{\ominus}$ (D) $I_2^{\ominus}$

10) When water freezes at 0°C, its density decreases due to
(A) Cubic structure of ice (B) Change of bond lengths (C) Change of bond angles (D) Empty spaces present in the structure of ice ●

11) The molecules of CO_2 in dry ice form the
(A) Ionic crystals (B) Covalent crystals (C) Molecular crystals ● (D) Atomic crystals

12) Splitting of spectral lines when atoms are subjected to strong magnetic field is called
(A) Zeeman effect ● (B) Stark effect (C) Photoelectric effect (D) Compton effect

13) The maximum number of electrons in a subshell is given by
(A) $2\ell - 1$ (B) $2\ell + 1$ (C) $2(2\ell - 1)$ (D) $2(2\ell + 1)$ ●

14) Which of the following molecules has net dipole moment?
(A) SiH_4 (B) SO_2 ● (C) $CC\ell_4$ (D) $A\ell C\ell_3$

15) Which of the following species has unpaired electrons in antibonding molecular orbitals?
(A) O_2^{2+} (B) O_2^{2-} (C) N_2^{2-} ● (D) F_2

16) For a given process, the heat change at constant pressure (q_p) and at constant volume (q_v) are related to each other as
(A) $q_p > q_v$ ● (B) $q_p < q_v$ (C) $q_p = q_v$ (D) $q_p = q_v/2$

17) The pH of 10^{-3} mol dm^{-3} of an aqueous solution of H_2SO_4 is
(A) 3.0 (B) 2.7 ● (C) 2.0 (D) 1.5

1124 (Inter Part - I) Warning:- Please, do not write anything on this question paper except your Roll No.

Chemistry (Subjective) (Session 2020-22 to 2023-25) Group (II) Paper (I)

Time Allowed: 2.40 hours Section ---------- I Maximum Marks: 68

2. Answer briefly any Eight parts from the followings:- 8 × 2 = 16

(i) Calculate the number of moles in 52 g of Aspartame ($C_{14}H_{18}N_2O_5$)
(ii) Write down the two steps to calculate the empirical formula.
(iii) Atomic masses of elements show many examples of fractional values. Justify.
(iv) How decolourization of undesirable colours can be done during crystallization.
(v) Define Sublimation. Name any two substances that can be sublimed.
(vi) What is safe and reliable method for drying the crystals? Briefly explain.
(vii) Calculate the mass of 10^{20} molecules of CO_2 at STP.
(viii) CO_2 is more non-ideal of 0°C than at 100°C. Explain with reason.
(ix) What is Joule-Thomson effect? Give its significance.
(x) Calculate the pH of 10^{-4} mole dm^{-3} of $Ba(OH)_2$
(xi) Write down K_c units for following reactions. $Sn^{+2}_{(aq)} + 2Fe^{+3}_{(aq)} \rightleftharpoons Sn^{+4}_{(aq)} + 2Fe^{+2}_{(aq)}$
(xii) The solubility of Glucose increases by increasing the temperature. Give reason.

3. Answer briefly any Eight parts from the followings:- 8 × 2 = 16

(i) Why melting and boiling points of halogens increase down the group.
(ii) Give one application of hydrogen bonding. **(iii)** Define isomorphism with one example.
(iv) Give two uses of Liquid Crystals. **(v)** Why positive rays are also called cannal rays.
(vi) What is Zeeman's effect. **(vii)** Give two postulates of Plank's theory.
(viii) State Hund's rule. **(ix)** Define energy of activation.
(x) Discuss homogeneous catalysis with example.
(xi) What is ebullioscopic constant. **(xii)** NaCℓ lowers the melting point of water. Justify.

4. Answer briefly any Six parts from the followings:- 6 × 2 = 12

(i) Why the second ionization energy is always greater than first ionization energy?
(ii) No bond in compounds is 100% ionic. Why? **(iii)** Sketch molecular orbital picture of N_2.
(iv) Define dipole moment. Give relationship between its various units.
(v) Define heat and temperature. **(vi)** What is thermochemical equation? Give two examples.
(vii) $\Delta H \approx \Delta E$ for reaction in solution form. Why?
(viii) Differentiate between oxidation and reduction with examples.
(ix) What electrode reactions occur in nickel cadmium battery?

Section ---------- II

Note: Attempt any three questions. (8 × 3 = 24)

5. **(a)** Define empirical formula. Write down any three steps involved in the determination of empirical formula.
(b) Define ionic solids. Write down its only three properties.

6. **(a)** A sample of krypton with a volume of 6.25 dm^3, a pressure of 765 torr and a temperature of 20 °C is expanded to a volume of 9.55 dm^3 and a pressure of 375 torr. What will be its final temperature in °C?
(b) Explain Millikan's oil drop experiment to determine the charge of an electron.

7. **(a)** Define hybridization. Explain sp^2 hybridization by taking example of Ethene.
(b) The solubility of PbF_2 at 25 °C is 0.64 g dm^{-3}. Calculate K_{sp} of PbF_2.

8. **(a)** Describe the measurement of enthalpy of a reaction by Bomb Calorimeter.
(b) Describe fuel cells. Give their uses.

9. **(a)** Describe Landsberger's method for the measurement of boiling point elevation.
(b) Write any four characteristics of a catalyst.

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Chemistry | Group: 1st | **HSSC(11th)1stAnnual 2024** | Roll No:_____(written by the candidate only)

Paper: I | Objective (iii) | Code 6 4 8 5 | Time: 20 Minutes | Marks: 17

Note: - You have four choices for each objective type question as A, B, C and D. The choice which you think is correct; fill that circle in front of that question number in your answer book. Use marker or pen to fill the circles. Cutting or filling up two or more circles will result no mark.

SECTION-A

Q.1	Questions	A	B	C	D
1.	Orbitals having same energy are called:	Degenerate orbitals	Valence orbitals	d-orbitals	s and p orbitals
2.	Amorphous solids:	Can possess small regions of orderly arrangement of atoms	Have sharp melting point	Have perfect arrangement of atoms	Undergo clean cleavage when cut with knife
3.	Halogen that exists as solid at room temperature is:	F_2	Cl_2	Br_2	I_2
4.	The order of rate of diffusion of gases NH_3, SO_2, Cl_2 and CO_2 is:	$NH_3 > SO_2 > Cl_2 > CO_2$	$Cl_2 > SO_2 > CO_2 > NH_3$	$NH_3 > CO_2 > Cl_2 > SO_2$	$NH_3 > CO_2 > SO_2 > Cl_2$
5.	What is the most abundant form of matter around us on our earth.	Gas	Liquid	Solid	Plasma
6.	How many steps are involved in complete quantitative characterization?	2	3	4	5
7.	Which of the given is used as decolourizing agent in crystallization?	Graphite	Animal Charcoal	H_2SO_4	KOH
8.	Which of the given is a mono isotopic element?	Fluorine	Chlorine	Silver	Calcium
9.	The largest number of molecules are present in:	4.8g of C_2H_5OH	3.6g of H_2O	2.8g of CO	5.4g of NO
10.	If salt bridge is not used between two half cells then the voltage:	Decreases slowly	Drops to zero	Decreases rapidly	Does not change
11.	The rate of reaction:	Decreases as the reaction proceeds	Increases as the reaction proceeds	Remains the same as the reaction proceeds	May decrease or increase as the reaction proceeds
12.	A solution of glucose is 10% w/v. The volume in which its one g.mole is dissolved will be:	1 dm^3	1.8 dm^3	200 cm^3	900 cm^3
13.	Which of the given is weak acid?	HCl	H_2SO_4	CH_3COOH	HNO_3
14.	One calorie is equal to:	0.4184 J	41.84 J	418.4 J	4.184 J
15.	Which of the given species has unpaired electrons in antibonding molecular orbitals?	O_2^{2-}	B_2	N_2^{2-}	F_2
16.	Molecular shape of SO_3 according to VSEPR Theory:	Triangular Planner	Linear	Pyramidal	Tetrahedral
17.	Visible range contains wave length in between:	200-400 n.m	400-750 n.m	200-800 n.m	800-1200 n.m

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Paper : I | Time: 2:40 Hours | Subjective | Marks: 68

Note:- Section B is compulsory. Attempt any THREE questions from Section C.

SECTION-B

2. Write short answers to any EIGHT parts. (8x2 = 16)

i. Why 23 g of sodium and 238 g of uranium have equal number of atoms in them?
ii. Define gram formula giving one example.
iii. Write down two characteristics of plasma.
iv. What do you mean by partition chromatography? Give Example.
v. Define sublimation and name at least two sublimed solids.
vi. How can rate of filtration be increased by flutted filter paper?
vii. How does values of equilibrium constant (Kc) help predict extent of a reaction?
viii. Why lighter gases diffuse more rapidly than heavier ones?
ix. How are acidic and basic buffers prepared? Give one example in each case.
x. State Charle's law of gases. Give its mathematical form.
xi. Differentiate between reversible and irreversible reactions with examples.
xii. How Mg-atom is twice heavier than that of carbon atom? Explain.

3. Write short answers to any EIGHT parts. (8x2 = 16)

i. Boiling needs constant supply of heat. Give reason.
ii. How chloroform and acetone are miscible with each other?
iii. How does liquid crystals act as temperature sensors?
iv. Why Molecular solids are soft and easily compressible?
v. What is the reason for production of positive rays?
vi. Differentiate between Zeeman and Stark effect.
vii. Give two points for the significance of Moseley's law.
viii. Why boiling points of solvents increase due to the presence of solutes?
ix. What do you mean by Heterogeneous catalysis? Give two examples.
x. Draw the shapes of 's' and 'p' orbitals.
xi. Rate of a reaction is everchanging parameter under the given conditions. Justify it.
xii. Define "Hydrolysis". Give two examples.

4. Write short answers to any SIX parts. (6x2 = 12)

i. Write down the electrode reactions in alkaline battery.
ii. Define dipole moment. Give its various units.
iii. What is pressure-volume work?
iv. Why do the ionization energies of elements decrease down the group of periodic table although the nuclear charge increases?
v. The abnormality of bond length in HI is less prominent than that of HCl. Give the reason.
vi. Why is MOT superior to VBT?
vii. Define standard enthalpy of a reaction. Give an example.
viii. Differentiate between exothermic and endothermic reactions.
ix. SHE acts as anode when connected with Cu electrode but as cathode when connected with Zn electrode. Give the reason.

SECTION-C: Note: Attempt any THREE questions. Each question carries EIGHT (08) marks. (8x3=24)

5. (a) What are Ions? Give their different types. Under what conditions these can be generated? (4)
   (b) Name the factors affecting the "London Forces". Explain the boiling points of halogens in detail. (4)
6. (a) Calculate the density of $CH_4(g)$ at 0°C and 1 atm pressure. (b) How $\frac{e}{m}$ value of electron is measured? (4+4)
7. (a) Define and explain co-ordinate covalent bond with three examples. (4)
   (b) What is the percentage ionization of acetic acid in a solution in which 0.1 moles of it has been dissolved per dm^3 of the solution (K_a of acetic acid=1.85×10^{-5}) ? (4)
8. (a) Describe in detail the measurement of enthalpy of combustion with the help of Bomb Calorimeter with diagram. (1+3=4)
   (b) Define primary storage cell. Explain silver oxide battery in detail. (1+1+2=4)
9. (a) What is Raoult's Law? Explain it with three statements also. (4)
   (b) Define order of reaction. Name various methods for its determination and explain only half life method in detail. (4)

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Paper : I | Objective (iv) | Code | 6 | 4 | 8 | 8 | Time: 20 Minutes | Marks: 17

Note: - You have four choices for each objective type question as A, B, C and D. The choice which you think is correct; fill that circle in front of that question number in your answer book. Use marker or pen to fill the circles. Cutting or filling up two or more circles will result no mark.

SECTION-A

Q.1	Questions	A	B	C	D
1.	The quantum number which gives information about degeneracy of orbitals in space is:	Principal quantum number	Azimuthal quantum number	Magnetic quantum number ●	Spin quantum number
2.	The molecules of CO_2 in dry ice form:	Ionic crystals	Covalent solids	Molecular solids ●	Metallic solids
3.	Acetone and Chloroform are soluble in each other due to:	Hydrogen bonding ●	Ion-dipole forces	Instantaneous dipole	London dispersion forces
4.	The partial pressure of oxygen in the air is:	116 torr	200 torr	159 torr ●	150 torr
5.	The drying agent used in vacuum desiccator is:	Benzoic acid	Glucose	Silical gel ●	Animal charcoal
6.	Solvent extraction is an equilibrium process and is controlled by:	Law of mass action	The amount of solvent	Distribution law ●	The amount of solute
7.	The molar volume of CO_2 is maximum at:	S.T.P	127 °C and 1 atm ●	0 °C and 2 atm	273 °C and 2atm
8.	The number of moles of CO_2 which contain 8.0g of oxygen is:	● 0.25	0.50	1.0	1.50
9.	The empirical formula of glucose is:	CHO	$C_6H_{12}O_6$	C_2HO	CH_2O ●
10.	The reduction potential of Zinc electrode is:	0.76 volt	−0.76 volt ●	−0.34 volt	0.34 volt
11.	The catalyst used in the decomposition of $KClO_3$ is:	$CuCl_2$	V_2O_5	MnO_2 ●	NO
12.	The molal boiling point constant is the ratio of the elevation in boiling point to:	Molarity	Mole fraction of solvent	Molality ●	Mole fraction of solute
13.	The pH of human blood is maintained at:	7.0	7.35 ●	4.0	14.0
14.	For a given process, the heat changes at constant pressure (q_p) and at constant volume (q_v) are related to each other as:	$q_p = q_v$	$q_p < q_v$	$q_p > q_v$ ●	$q_p = \frac{q_v}{2}$
15.	Which of the hydrogen halides has the highest percentage of ionic character?	HCl	HBr	HF ●	HI
16.	C_2H_4 (ethene) shows hybridization:	sp^3	sp^2 ●	sp	dsp^2
17.	The wave number of the light emitted by a certain source is $2x10^6$ m^{-1}. The wavelength of this light will be:	500 nm	500 m ●	200 nm	$5x10^7$m

212-324-14-11000 ★★★★

emistry | Group: 2nd | HSSC(11th)1st Annual 2024 | Roll No:_____(written by the candidate only)

aper: I | Time: 2:40 Hours | Subjective | Marks: 68

Note:- Section B is compulsory. Attempt any THREE questions from Section C.

SECTION-B

2. Write short answers to any EIGHT parts. (8x2 = 16)

i. Define Avogadro's number with a suitable example.
ii. Write down two assumptions of stoichiometry.
iii. Many chemical reactions involve limiting reactant as taking place in our surrounding. Justify.
iv. Why is crystallization a better technique for separation and purification?
v. Name any four sublimed solids.
vi. What is R_f value? Also write down its formula.
vii. Deduce Boyle's law with the help of Kinetic theory of gases.
viii. Write down any four applications of plasma.
ix. How does buffer act?
x. The plot of PV versus P is a straight line at constant temperature and with a fix number of moles of an ideal gas. Explain.
xi. How does equilibrium constant (Kc) predict direction of a reaction?
xii. Give optimum conditions to get maximum yield of Ammonia (NH_3).

3. Write short answers to any EIGHT parts. (8x2 = 16)

i. What are liquid crystals? Write down their any two uses.
ii. Evaporation causes cooling, why?
iii. Define Anisotropy. Give example.
iv. Ionic crystals are highly brittle, why?
v. Write down any two properties of neutrons.
vi. What is stark effect?
vii. What is meant by dual nature of matter?
viii. Define spin quantum number.
ix. What is percentage weight / weight? Give example.
x. Non ideal solutions do not obey Roults' law, why?
xi. What is heterogeneous catalysis? Give example.
xii. Define energy of activation.

4. Write short answers to any SIX parts. (6x2 = 12)

i. Why atomic radius cannot be measured precisely?
ii. Size of an anion is always larger than its parent atom. Justify.
iii. Why is the second electron affinity of oxygen positive?
iv. Why He_2 does not exist under normal conditions.
v. Why is it necessary to mention physical states of reactants and products in thermo chemical equation?
vi. Define internal energy with one example.
vii. Calculate oxidation number of Cr in $K_2Cr_2O_7$.
viii. Write down importance of standard hydrogen electrode.
ix. Define heat and work.

SECTION-C: Note: Attempt any THREE questions. Each question carries EIGHT (08) marks. (8x3 = 24)

5. (a) What is meant by combustion analysis? Draw neat diagram. Also write down formulas to calculate percentages of carbon and hydrogen. (1+1+2)
   (b) What are ionic solids? Write down any six properties of ionic solids. (1+3)
6. (a) Calculate the mass of 1 dm^3 of NH_3 gas at 30 °C and 1000 mmHg pressure considering that NH_3 is behaving ideally. (4)
   (b) Write down any eight properties of cathode rays. (4)
7. (a) Write down four postulates of VSEPR theory. (4)
   (b) The solubility product of Ag_2CrO_4 is 2.6×10^{-2} at 25 °C. Calculate the solubility of the compound. (4)
8. (a) State first law of thermodynamics. How will you prove that work done by the system is negative ($W = -P\Delta V$). (4)
   (b) What is electrochemical series? Explain the following application in detail: (1+3)
   (i) Comparison of the relative tendency of metals and non metals to get oxidized or reduced.
9. (a) Explain Beckmann method for the measurement of freezing point depression with diagram. (3+1)
   (b) Define order of reaction. Give one example of first order, second order and third order reaction. (1+1+1+1)

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