Paper Code Number: 2485		2023 (1st-A) INTERMEDIATE PART-I (11th Class)		Roll No: _____

CHEMISTRY PAPER-I   GROUP-I MTN-11-1-23

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	Pressure remaining constant at which temperature the volume of a gas will become twice of what it is at $0^o C$:	$200^o C$	$546 K$	$546^o C$	$273 K$
2	The deviation of a gas from ideal behaviour is maximum at:	$-10^o C$ and 5.0 atm	$-10^o C$ and 2.0 atm	$100^o C$ and 2.0 atm	$0^o C$ and 2.0 atm
3	Glycerin boils at $210^o C$ when external pressure is:	760 torr	500 torr	100 torr	50 torr
4	Diamond is bad conductor because:	It has a tight structure	It has a high density	There are no free electron present in the crystal of diamond to conduct electricity	Is transparent to light
5	Quantum number values for $2p$ orbitals are:	$n = 1, \ell = 2$	$n = 2, \ell = 1$	$n = 1, \ell = 0$	$n = 2, \ell = 0$
6	Which of the following molecule has zero dipole moment?	CO_2	H_2O	HI	$CH_3C\ell$
7	One calorie is equivalent to:	$0.4184 J$	$418.4 J$	$41.84 J$	$4.184 J$
8	The study of heat changes accompanying a chemical reaction is known as:	Chemistry	Thermochemistry	Physical chemistry	Biochemistry
9	The pH of 10^{-3} mol/dm^3 of an aqueous solution of H_2SO_4 is:	3.0	2.0	2.7	1.5
10	pH of soft drinks is approximately:	1.5	1.0	2.0	3.0
11	An aqueous solution of ethanol in water may have vapour pressure:	Equal to that of water	Equal to that of ethanol	More than that of water	Less than that of water
12	Oxidation number of all elements in free state is:	Zero	$+1$	$+2$	-1
13	If the salt bridge is not used between two half cells, then the voltage:	Decrease rapidly	Decrease slowly	Does not change	Drops to zero
14	If the rate equation of a reaction $2A + B \rightarrow$ products is, rate $= K[A]^2[B]$ and A is present in large excess, then the order of reaction is:	01	02	03	04
15	Empirical formula of glucose is:	CH_2O	$C_2H_4O_2$	$C_6H_{12}O_6$	$C_2H_2O_2$
16	One mole of SO_2 contains:	6.02×10^{23} atoms of oxygen	18.1×10^{23} molecules of SO_2	4 gram atoms of SO_2	6.02×10^{23} atoms of sulphar
17	Which of the following is used as decolourizing agent in crystallization?	H_2SO_4	Graphite	Animal charcoal	H_2O

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.

MTN –11–1–23   **SECTION-I**

2. Attempt any eight parts. $8 \times 2 = 16$

(i) No individual neon atom in the sample of the element has a mass of 20.18 amu.

(ii) Many chemical reactions taking place in our surrounding involve the limiting reactants. Justify.

(iii) 180g of glucose and 342g of sucrose have the same number of molecules but different number of atoms present in them. Why?

(iv) Justify that $1 cm^3$ of H_2 and $1 cm^3$ of CH_4 at STP will have same number of molecules, when one molecule of CH_4 is 8 times heavier than that of hydrogen.

(v) Why do we feel comfortable in expressing the densities of gases in the units of $g\, dm^{-3}$ rather than $g\, cm^{-3}$?

(vi) Water vapours do not behave ideally at 273K. Why?

(vii) Do you think that the size of Li^{+2} is even smaller than He^+? Justify it.

(viii) Distribute electrons in orbitals of $_{24}Cr$, $_{13}Al$.

(ix) The e/m value for positive rays obtained from hydrogen gas is 1836 times less than that of Cathode rays. Justify it.

(x) What is meant by standard enthalpy of neutralization? Give one example.

(xi) Prove that $q_v = \Delta E$

(xii) Differentiate between system and surrounding with one example for each.

3. Attempt any eight parts. $8 \times 2 = 16$

(i)	Write down factors affecting relative lowering of vapour pressure.	2
(ii)	Define Solubility. What are Solubility Curves? Give names only.	1 + 1
(iii)	In $CuSO_4 . 5H_2O$, four water molecules are attached with Cu^{2+} ion while one water molecule with SO_4^{2-} ion. Give reason.	2
(iv)	What is Instantaneous and Average Rate of reaction?	1 + 1
(v)	Write Spectrometry and Optical Rotation Method for the determination of rate of reaction.	1 + 1
(vi)	Define Catalysis. Give only one characteristic of catalyst.	1 + 1
(vii)	How rate of filtration can be increased?	1 + 1
(viii)	What is safe and reliable method for drying the crystals?	2
(ix)	Define Distribution Law. What is distribution coefficient?	1 + 1
(x)	Evaporation causes cooling. Justify.	2
(xi)	Why electrical conductivity of metallic solids decreases by increasing temperature?	2
(xii)	What is cubic close packing and hexagonal close packing?	1 + 1

4. Attempt any six parts. $6 \times 2 = 12$

(i) Why Helium does not exist in diatomic form?

(ii) What is Coordinate Covalent Bond? Give one example.

(iii) Justify that Covalent Bonds in directional in nature.

(iv) What is Common Ion Effect?

(v) What is Buffer Capacity?

(vi) What is pK_a? Give its significance.

(vii) Define Electrochemistry.

(viii) Calculate the oxidation number of Mn in $KMnO_4$.

(ix) Define Electrolytic Conduction.

SECTION-II

NOTE: Attempt any three questions. $3 \times 8 = 24$

5.(a)	What is stoichiometry? Give assumptions mention two important laws which help to perform the stoichiometric calculations.	4
(b)	There is a mixture of hydrogen, helium and methane occupying a vessel of volume $13\, dm^3$ at $37^\circ C$ and pressure of 1 atmosphere. The masses of hydrogen and helium are 0.8g and 0.12g respectively. Calculate the partial pressures in torr of each gas in the mixture.	4
6.(a)	What are Liquid Crystals? Give their three uses in daily life.	1 + 3 = 4
(b)	State First Law of Thermodynamics. Also prove that $\Delta E = q_v$	1 + 3 = 4
7.(a)	Write down Millikan's Oil Drop Method for the measurement of charge of an electron.	4
(b)	Benzoic acid, C_6H_5COOH, is a weak mono-basic acid ($K_a = 6.4 \times 10^{-5}\, mol\, dm^{-3}$). What is the pH of a solution containing 7.2g of sodium benzoate in one dm^3 of $0.02\, mol\, dm^{-3}$ benzoic acid?	4
8.(a)	State postulates of VSEPR Theory.	4
(b)	What is SHE? How it can be used to measure Electrode potential? (Construction 01 + diagram 01 + electrode potential measurement 02) = 4	4
9.(a)	Describe in detail the Elevation of Boiling Point.	4
(b)	Explain Chemical Method for the determination of rate of reaction.	4

Paper Code Number: 2488	2023 (1st-A) INTERMEDIATE PART-I (11th Class)			Roll No: _____

CHEMISTRY PAPER-I GROUP-II MTN-11-2-23

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	Quantum number values for 2p orbitals are:	$n = 2, \ell = 0$	$n = 1, \ell = 2$	$n = 1, \ell = 0$	$n = 2, \ell = 1$
2	The number of bonds in nitrogen molecule is:	One σ and one π	One σ and two π	Three sigma only	Two σ and one π
3	The change in heat energy of a chemical reaction at constant temperature and pressure is called:	Enthalpy change	Heat of sublimation	Bond energy	Internal energy change
4	An excess of aqueous $AgNO_3$ is added to aqueous $BaCl_2$ and precipitate is removed by filtration. What are the main ions in the filtrate?	Ag^+ and $N\overline{O}_3$ only	Ag^+, Ba^{2+} and $N\overline{O}_3$	Ba^{2+} and $N\overline{O}_3$ only	Ba^{2+}, $N\overline{O}_3$ and Cl
5	Molarity of pure water is:	1	18	55.5	6
6	The cathodic reaction in the electrolysis of dil. H_2SO_4 with Pt electrodes is:	Reduction	Oxidation	Both oxidation and reduction	Neither oxidation nor reduction
7	In zero order reaction, the rate is independent of:	Temperature of reaction	Concentration of reactants	Concentration of products	None of these
8	Number of molecules of CH_4 in 16g of CH_4:	12.1×10^{23}	3.01×10^{23}	6.02×10^{23}	1.5×10^{23}
9	The volume occupied by one mole of a gas at STP is:	$54\,dm^3$	$22.414\,dm^3$	$2.24\,dm^3$	$2.4\,dm^3$
10	The strongest acid among halogen acids is:	HI	HBr	HCl	HF
11	Enthalpy of combustion of C_2H_5OH is:	$-1168\,kJ\,mol^{-1}$	$-1268\,kJ\,mol^{-1}$	$-1368\,kJ\,mol^{-1}$	$-1468\,kJ\,mol^{-1}$
12	Optimum pressure in Haber's process for synthesis of NH_3 is:	100 – 150 atm	200 – 300 atm	350 – 450 atm	500 – 600 atm
13	The reduction potential of Zn is:	$-0.76\,v$	$-0.34\,v$	$+0.34\,v$	$+0.76\,v$
14	The volume occupied by 1.4 g of N_2 at S.T.P is:	$2.24\,dm^3$	$22.4\,dm^3$	$112\,dm^3$	$1.12\,dm^3$
15	Solvent extraction is an equilibrium process and is controlled by:	Law of mass action	Distribution law	The amount of solvent used	The amount of solute
16	Pressure remaining constant, at which temperature the volume of a gas will become twice of what it is at $0^o C$:	$546^o C$	$200^o C$	$546\,K$	$273\,K$
17	Acetone and chloroform are soluble in each other due to:	Intermolecular hydrogen bonding	Ion-dipole interaction	Instantaneous dipole	All of these

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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.

MTN-11-2-23   **SECTION-I**

2. Attempt any eight parts. $8 \times 2 = 16$

(i) Define Stoichiometry. Write its assumptions.

(ii) What do you know about Avogadro's number? Give one example.

(iii) Calculate the mass in grams of 2.74 moles of $KMnO_4$. At mass of $Mn = 55$, At mass of $K = 39$.

(iv) State Charles's Law. Write its mathematical form.

(v) Write two application of Dalton's Law of Partial pressure.

(vi) How you can determine the molecular mass of an unknown gas, if we know the pressure, temperature and volume along with the mass of that gas?

(vii) Whichever gas is used in the discharge tube, the nature of the cathode rays remains the same. Why?

(viii) Write names of different Quantum Numbers.

(ix) Differentiate between Frequency and Wave number.

(x) Define Enthalpy of formation. Give one example.

(xi) Define Heat Capacity. Write its formula to calculate it.

(xii) State First Law of Thermodynamics. Write its mathematical form.

3. Attempt any eight parts. $8 \times 2 = 16$

(i) Give difference between Qualitative analysis and Quantitative analysis.

(ii) How rate of filtration can be increased by using fluted filter paper?

(iii) Define Partition Chromatography. Give one example.

(iv) What are Dipole-dipole forces of attraction? Give example.

(v) Why ice floats over surface of liquid water?

(vi) Define crystal lattice and unit cell.

(vii) Why heat of hydrate of Li^+ is greater the that of Cs^+?

(viii) Why ethylene glycol is added in radiator of automobile?

(ix) What are Conjugated solutions? Give one example.

(x) Define heterogeneous catalysis. Give an example.

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

(xii) Discuss order of reaction with one example.

4. Attempt any six parts. $6 \times 2 = 12$

(i) Why is sigma bond stronger than pi-bond?

(ii) He_2 molecule is not formed. How do MOT justify it?

(iii) Why do the ionization energies of elements decrease down the group of periodic table, although the nuclear charge increases?

(iv) Why do we need buffer solutions?

(v) What is the effect of rise in temperature on the solubility of KI in water?

(vi) What is Lowry Bronsted idea of acids and bases?

(vii) Write down the electrode reactions in alkaline battery.

(viii) How can copper be purified electrolytically?

(ix) What is emf of a cell?

SECTION-II

NOTE: Attempt any three questions. $3 \times 8 = 24$

5.(a) Explain Isotopes. Also describe relative abundance of isotopes.   4

(b) A sample of nitrogen gas is enclosed in a vessel of volume $380 \, cm^3$ at $120°C$ and pressure of $101325 \, Nm^{-2}$. This gas is transferred to a $10 \, dm^3$ flask and cooled to $27°C$. Calculate the pressure in Nm^{-2} entered by the gas at $27°C$.   4

6.(a) What is meant by vapour pressure of a liquid? How is it measured by manometric method?   4

(b) Prove that $\Delta H = q_p$, complete mathematical form.   4

7.(a) Explain Millikan's Oil Drop Method to calculate charge on electron.   4

(b) The solubility of CaF_2 at $25°C$ 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) Write the postulates of VSEPR theory. Also discuss the structure of NH_3 on the basis of VSEPR theory.   4

(b) What is Electrochemical series? Also explain its any two applications.   4

9.(a) Write down measurement of elevation of boiling point by Landsberger's method with diagram. $3+1=4$

(b) Write down any four physical methods for the determination of rate of reaction.   4