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

Roll No. of Candidate : _____

CHEMISTRY **Intermediate Part-I , Class 11th (1stA 323- 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 - The molar volume of CO_2 is maximum at
(A) STP (B) 127°C and 1 atm (C) 0°C and 2 atm (D) 273°C and 2 atm

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

3 - The rate of reaction
(A) increases as the reaction proceeds (B) decreases as the reaction proceeds
(C) remains same as the reaction proceeds (D) may increase or decrease as reaction proceeds

4 - Water boils at 98°C at external pressure of
(A) 700 torr (B) 765 torr (C) 800 torr (D) 900 torr

5 - Stronger is the oxidizing agent, greater is the
(A) oxidation potential (B) reduction potential
(C) redox potential (D) emf of the cell

6 - Catalyst used in conversion of SO_2 into SO_3 in contact process is
(A) MgO (B) Al_2O_3 (C) SiO_2 (D) V_2O_5

7 - Quantum number values for 2P orbital are
(A) $n=2, \ell=1$ (B) $n=1, \ell=2$ (C) $n=1, \ell=0$ (D) $n=2, \ell=0$

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

9 - Oxidation number of Fluorine in OF_2 is
(A) –1 (B) –2 (C) +2 (D) +1

10 - Gooch crucible is made up of
(A) porcelain (B) silver (C) iron (D) glass

11 - Mass of one mole of electrons is
(A) 1.008 mg (B) 0.55 mg (C) 0.184 mg (D) 1.673 mg

12 - The partial pressure of Oxygen in air is
(A) 116 torr (B) 159 torr (C) 180 torr (D) 190 torr

13 - Calorie is equivalent to
(A) 0.4184 J (B) 41.84 J (C) 4.184 J (D) 418.4 J

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

15 - The number of bonds in Nitrogen molecule is
(A) one Sigma and One Pi (B) One Sigma and Two Pi
(C) Three Sigma only (D) Two Sigma one Pi

16 - Ionic solids are characterized by
(A) low melting points (B) good conductivity in solid state
(C) high vapour pressure (D) solubility in polar solvents

17 - Nickel has isotopes
(A) 2 (B) 3 (C) 4 (D) 5

CHEMISTRY **Intermediate Part-I , Class 11th (1stA 323)** **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 - Calculate the moles of Cl atoms in 0.822 g of $C_2H_4Cl_2$.
ii - What is the difference between gram atom and gram ion?
iii - No individual neon atom has a mass of 20.18 amu. Why?
iv - How does the respiration process involve Dalton's law of partial pressures?
v - Give the quantitative definition of Charles's law.
vi - Where is plasma found?
vii - What is Moseley's law? Give its significance.
viii - Write down the electronic configuration of $_{29}Cu$ and $_{19}K$.
ix - The velocities of electrons in higher orbits are less than those in lower orbits of hydrogen atom. Give the reason.
x - Define standard enthalpy of combustion. Give an example.
xi - What is meant by state function? Give two examples.
xii - Define exothermic reaction. Give an example.

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

i - Define water of crystallization. Give example.
ii - How do you justify that the boiling point of one molal urea solution is 100.52° C but the boiling point of two molal urea solution is less than 101.04° C?
iii - Give two statements of Raoults law.
iv - Differentiate between fast step and the rate determining step.
v - What are enzymes? Give an example.
vi - The reaction happens due to collisions among the molecules but all the collisions are not fruitful. Justify it.
vii - How does a Gooch crucible increases the rate of filtration?
viii - Give the main characteristics of the solvent used for crystallization.
ix - What is ether extraction?
x - Define polymorphism. Give example.
xi - Hydrogen bonding is present in chloroform and acetone. Justify it.
xii - How liquid crystals can act as temperature sensors?

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

i - Atomic radius decreases from left to right in a period, justify.
ii - Define electron affinity, give one example.
iii - How the criteria of electronegativity helps us to understand the nature of bond?
iv - What is buffer capacity?
v - Value of pK_a and pK_b are related to strength of acid and bases. Justify it.
vi - Define solubility product with an example.
vii - Differentiate between electrolytic and galvanic cell.
viii - What is electrolysis? Give an example.
ix - How anodized aluminium is prepared in an electrolytic cell?

(Turn Over)

Roll No. of Candidate : _____

CHEMISTRY **Intermediate Part-I , Class 11th (1stA 323- III)** **Paper : I** **Group – II**

Time: 20 Minutes **OBJECTIVE** **Code : 6486** **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 - 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

2 - 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

3 - 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 dissolve (D) no reaction takes place

4 - Calori is equal to
(A) 0.4184 J (B) 41.84 J (C) 4.184 J (D) 418.4 J

5 - The oxidation No. of Nitrogen in HNO_3 is
(A) +3 (B) –3 (C) –5 (D) +5

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

7 - An aqueous solution of ethanol in water may have vapour pressure
(A) equal to that of water (B) equal to that of ethanol
(C) more than that of water (D) less than that of water

8 - Feeling uncomfortable breathing in unpressurized cabin is due to
(A) high pressure of CO_2 (B) low pressure of CO_2
(C) low pressure of O_2 (D) high pressure of O_2

9 - The value of pH of pure water at 25° C is
(A) 14 (B) 7 (C) 1×10^{-14} (D) 1×10^{14}

10 - 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

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

12 - 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 size crystals
(C) is evaporated to get the crystals of the product
(D) is mixed with immisible to get the pure crystals of the product

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

14 - 27 g of Al will react how much mass of O_2 to produce Al_2O_3
(A) 8 g of Oxygen (B) 16 g of Oxygen (C) 32 g of Oxygen (D) 24 g of Oxygen

15 - Diamond is a bad conductor because
(A) it has a tight structure
(B) there are no free electrons present in the crystal of diamond to conduct electricity
(C) it has a heigh density
(D) is transparent to light

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

17 - Liquid Hydrocarbon is
(A) Methane (B) Pentane (C) Hexane (D) Propane

Roll No. of Candidate : _____

CHEMISTRY **Intermcdiate Part-I , Class 11th (1stA 323- III)** **Paper : I** **Group – II**

Time: 20 Minutes **OBJECTIVE** **Code : 6486** **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.

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(A) temperature of reaction (B) concentration of reactants
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(A) 3.0 (B) 2.7 (C) 2.0 (D) 1.5

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(C) bond energy (D) internal energy change

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(A) equal to that of water (B) equal to that of ethanol
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(A) high pressure of CO_2 (B) low pressure of CO_2
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9 - The value of pH of pure water at 25° C is
(A) 14 (B) 7 (C) 1×10^{-14} (D) 1×10^{14}

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(D) is mixed with immisible to get the pure crystals of the product

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

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(A) 8 g of Oxygen (B) 16 g of Oxygen (C) 32 g of Oxygen (D) 24 g of Oxygen

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(A) it has a tight structure
(B) there are no free electrons present in the crystal of diamond to conduct electricity
(C) it has a heigh density
(D) is transparent to light

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

17 - Liquid Hydrocarbon is
(A) Methane (B) Pentane (C) Hexane (D) Propane

CHEMISTRY **Intermediate Part-I , Class 11th (1stA 323- I)** **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 - What is the significance of John Dalton's work about atom?
ii - Define molar volume, give an example.
iii - How many moles are present in 18 g of H_2O?
iv - What is effect of pressure and heat on the behaviour of gases?
v - Give the S.I units of R.
vi - State Avogadro's law and give an example.
vii - Define frequency, give its relationship with wavelength.
viii - Differentiate between continuous and line spectrum.
ix - How neutron was discovered?
x - Distinguish between Exothermic and Endothermic reactions.
xi - Show how change in internal energy is related to q_v?
xii - What do you know about standard enthalpy of neutralization?

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

i - Define molarity and molar solution.
ii - What are discontinuous solubility curves?
iii - Define Hydrates with one example.
iv - What is meant by activation of a catalyst?
v - Draw lock and key model of enzyme catalysis.
vi - How light affects rate of reaction?
vii - What is sintered glass crucible? What is its advantage?
viii - How fluted filter paper can be prepared?
ix - Write down any two uses of chromatography.
x - Define dipole-dipole forces. Give one example.
xi - Define hydrogen bonding. Give one example.
xii - What is meant by Anisotropy? Give one example.

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

i - Define bond order and what is bond order of O_2^{2+}
ii - Why MOT is superior to UBT?
iii - Differentiate between polar and nonpolar covalent bonds with examples.
iv - How ammonia is synthesized by Haber's process? Also give the optimum conditions for reaction.
v - Give the two applications of the solubility product.
vi - The change of temperature disturbs both the equilibrium position and the equilibrium constant of a reaction. Explain with reason.
vii - What is fuelcell and where it is used?
viii - Write down two applications of electrochemical series.
ix - What is SHE? Give its potential value.

(Turn Over)

SECTION – II

Note: Attempt any THREE (3) questions.

5. **(a)** Explain combustion analysis with diagram and write formulas for percentage of Carbon, Hydrogen and Oxygen. **(2+1+1 =4)**

(b) Calculate the mass of 1 dm^3 of NH_3 gas at 30°C and 1000 mm Hg pressure, considering that NH_3 is behaving ideally. **(4)**

6. **(a)** What are London forces? Explain factors affecting London forces. **(4)**

(b) State first law of thermodynamics. Also prove that $\Delta E = q_v$ **(4)**

7. **(a)** Describe Millikan's Oil Drop Method for the measurement of charge on an electron. **(4)**

(b) The solubility product of $Ca(OH)_2$ is 6.5×10^{-6}. Calculate the solubility of $Ca(OH)_2$. **(4)**

8. **(a)** Define atomic orbital hybridization. Explain SP^2 hybridization by giving example of BF_3. **(4)**

(b) Define electrochemical series and give any three applications of it. **(4)**

9. **(a)** Discuss in detail any two examples of solutions of partially miscible liquid. **(4)**

(b) Differentiate between homogeneous catalysis and heterogeneous catalysis with one example in each. **(4)**

Roll No. of Candidate : _____

CHEMISTRY **(Intermediate Part-I, Class 11th) 322 - (III)** **Paper I** **(Group – I)**

Time: 20 Minutes **OBJECTIVE ----- Code : 6485** **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. Attempt as many questions as given in objective type question paper and leave others blank.

1. 1 - An aqueous solution of ethanol in water may have vapour pressure _____ .
(A) equal to that of water (B) equal to that of ethanol
(C) more than that of water (D) less than that of water

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

3 - Amorphous solids _____ .
(A) have sharp melting points
(B) undergo clean cleavage when cut with knife
(C) have perfect arrangement of atoms
(D) can possess small regions of orderly arrangement of atoms

4 - In endothermic reactions, the heat content of the _____ .
(A) products is more than that of reactants (B) reactants is more than that of products
(C) surroundings increases (D) reactants and products is equal

5 - When 6d orbital is completed, the entering electron goes into _____ .
(A) 7f (B) 7s (C) 7p (D) 7d

6 - Orbitals having same energy are called _____ .
(A) hybrid orbitals (B) valence orbitals (C) degenerate orbitals (D) d-orbitals

7 - Solvent extraction is controlled by _____ .
(A) distribution law (B) Newton's law (C) law of mass action (D) Graham's law

8 - The mass of one mole of electrons is _____ .
(A) 1.008 mg (B) 0.55 mg (C) 0.184 mg (D) 1.673 mg

9 - VSEPR theory was developed by _____ .
(A) Sidgwick and Powell (B) Sidgwick and Nylholm
(C) Powell and Gillespie (D) Nylholm and Gillespie

10 - If the salt bridge is not used between two half cells, then the voltage _____ .
(A) decreases rapidly (B) decreases slowly (C) does not change (D) drops to zero

11 - An excess of aqueous silver nitrate is added to aqueous barium chloride and precipitate is removed by filtration. What are main ions in the filtrate?
(A) Ag^+ and NO_3^- only (B) Ag^+ and Ba^{+2} and NO_3^-
(C) Ba^{+2} and NO_3^- only (D) Ba^{+2} and NO_3^- and Cl^-

12 - A limiting reactant is the one which _____ .
(A) is taken in lesser quantity in gm as compared to other reactants
(B) is taken in lesser quantity in volume as compared to the other reactants
(C) gives the maximum amount of the product which is required
(D) gives the minimum amount of the product under consideration

13 - _____ is not used as drying agent in a desiccator.
(A) water (B) $CaCl_2$ (C) silica gel (D) phosphorus pentoxide

14 - BF_3 shows _____ hybridization.
(A) sp^2 (B) sp^3 (C) sp (D) sp^3d

15 - Equal masses of methane and oxygen are mixed in an empty container at $25^\circ C$. The fraction of total pressure exerted by oxygen is _____ .
(A) $\frac{1}{3}$ (B) $\frac{8}{9}$ (C) $\frac{1}{9}$ (D) $\frac{16}{17}$

16 - The deviation of a gas from ideal behaviour is maximum at _____ .
(A) $-10^\circ C$ and 5.0 atm (B) $-10^\circ C$ and 2.0 atm (C) $100^\circ C$ and 2.0 atm (D) $0^\circ C$ and 2.0 atm

17 - _____ is a pseudo solid.
(A) CaF_2 (B) glass (C) NaCl (D) sugar

CHEMISTRY (Intermediate Part-I, Class 11th) 322 **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 - What is molecular ion? Write down formulas of any two of these ions.
ii - Differentiate between empirical and molecular formula.
iii - Mg (Magnesium) atom is twice heavier than C (Carbon) atom. Justify.
iv - How crystals are dried in vacuum desiccator?
v - What is R_f value? Why does it has no units?
vi - What is partition chromatography?
vii - Convert $-40\,^{\circ}C$ into Fahrenheit scale.
viii - Define absolute zero temperature.
ix - "Water vapours do not behave ideally at 273 K". Explain it.
x - What is Le-chatelier's principle?
xi - Define solubility product.
xii - Prove that $Ka = \frac{[H_3O^+][A^-]}{[HA]}$

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

i - Boiling needs a constant supply of heat. Give reason.
ii - The vapour pressures of solids are far less than those of liquids. Why?
iii - Define symmetry. Give its elements.
iv - What are ionic solids? Give two examples.
v - Whichever gas is used in the discharge tube, the nature of cathode rays remains the same. Why?
vi - What is the origin of line spectrum?
vii - State Pauli's exclusion principle.
viii - Write down names of two spectral series alongwith their regions.
ix - The concentration in terms of molality is independent of temperature but molarity depends upon temperature . Why?
x - Define hydrolysis. Give an example.
xi - What is activated complex?
xii - What is half-life period? Give an example.

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

i - Write Lewis structures of i) CCl_4 ii) HCN
ii - Why Noble gases don't form chemical bonds?
iii - O_2 shows paramagnetic behavior; why?
iv - Why CH_4 does not form co-ordinate covalent bond but H_2O can form?
v - Is it true that non spontaneous process never happens in the universe?
vi - What does the symbol ΔH_n^o denote? Define this quantity.
vii - Burning of candle is spontaneous process; brief it.
viii - What is difference between primary and secondary cell?
ix - SHE acts as cathode when connected with zinc; why?

(Turn Over)

(SECTION – II)

Note: Attempt any THREE (3) questions from Section II..

5. (a) Define yield. How theoretical and practical yield can be calculated? **(1+3)**
   (b) Define quantum numbers. Explain azimuthal quantum number in detail. **(1+3)**

6. (a) Calculate the density of CH_4 (g) at $0^{\circ}C$ and 1 atm pressure. What happens to the density if the pressure is increased to 2 atm at $0^{\circ}C$? **(4)**
   (b) Explain the construction of lead accumulator. Give its discharging process. **(4)**

7. (a) Draw the molecular orbital diagram for O_2 and explain its paramagnetic behaviour. **(2+2)**
   (b) How the enthalpy of a reaction can be measured by using glass calorimeter? **(3+1)**

8. (a) What are London forces? Write down factors affecting them. **(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}. **(1+1+1+1)**

9. (a) Differentiate between **(2+2)**
      i) Ideal and non-ideal solutions.
      ii) Hydration and hydrolysis
   (b) Define catalysis. Explain its types with suitable examples. **(1+3)**

Roll No. of Candidate : _____

CHEMISTRY (Intermediate Part-I, Class 11th) 322 - (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. Attempt as many questions as given in objective type question paper and leave others blank.

1. 1 - The pH of 10^{-3} mol.dm^{-3} of an aqueous solution of H_2SO_4 is _____.
(A) 1.5 (B) 2.0 (C) 3.0 (D) 2.7

2 - _____ substance is used as decolourizing agent in crystallization process
(A) silica gel (B) animal charcoal (C) $CaCl_2$ (D) H_2SO_4

3 - Bohr model of atom is contradicted by _____.
(A) planks quantum theory (B) dual nature of matter
(C) Heisenberg's uncertainty principle (D) all of these

4 - When water freezes at $0^{\circ}C$ its density decreases due to _____.
(A) cubic structure of ice (B) changes bond length
(C) empty spaces present in structure of ice (D) changes bond angles

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 - An aqueous solution of ethanol in water may have vapour pressure _____.
(A) equal to that of water (B) more than that of water
(C) equal to that of ethanol (D) less than that of water

7 - _____ is a pseudo solid.
(A) glass (B) CaF_2 (C) NaCl (D) HCl

8 - Orbitals having same energy are called _____.
(A) degenerate orbitals (B) S and P orbitals (C) molecular orbitals (D) valence orbitals

9 - In Sp^3 hybrid orbital "S" character is _____.
(A) 25% (B) 50% (C) 75% (D) 100%

10 - Number of molecules in one dm^3 of water is close to _____.
(A) $\frac{6.02}{22.4} \times 10^{23}$ (B) $\frac{12.04}{22.4} \times 10^{23}$ (C) $\frac{18}{22.4} \times 10^{23}$ (D) $55.6 \times 6.02 \times 10^{23}$

11 - Solvent extraction is an equilibrium process and is controlled by _____.
(A) law of mass action (B) amount of solvent used (C) distribution law (D) amount of solute

12 - If the rate equation of a reaction $2A + B \longrightarrow$ products is, rate $= K[A]^{-2}[B]$ and A is present in large excess then order of reaction is
(A) 1 (B) 2 (C) 3 (D) 4

13 - The number of bonds in nitrogen molecule is _____.
(A) one σ and one π (B) one σ and two π (C) three sigma only (D) two σ and one π

14 - How many subatomic particles are thought to exist in an atom.
(A) 3 (B) 20 (C) 50 (D) 100

15 - Stronger the oxidizing agent greater is the _____.
(A) redox potential (B) E.M.F. of cell (C) oxidation potential (D) reduction potential

16 - The molar volume of CO_2 is maximum at _____
(A) STP (B) $127^{\circ}C$ and 1 atm (C) $0^{\circ}C$ and 2 atm (D) $273^{\circ}C$ and 2 atm

17 - For the reaction $NaOH + HCl \longrightarrow NaCl + H_2O$ the enthalpy change is called _____.
(A) heat of reaction (B) heat of formation (C) heat of neutralization (D) heat of combustion

CHEMISTRY **(Intermediate Part-I, Class 11th) 322** **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 - What is mass spectrum?

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 - Define limiting reactant. Give an example.

iv - Write down the names of any four major steps involved in crystallization.

v - What is ether extraction?

vi - What is paper chromatography? Name its two types.

vii - What is mean square velocity?

viii - Where is plasma found?

ix - Derive Charle's law from kinetic molecular theory of gases.

x - What is common ion effect? Give an example.

xi - Write down the Henderson's equation to determine the pH of a buffer solution.

xii - Define solubility product. Give an example.

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

i - Ionic crystals are highly brittle. Justify it.

ii - Cleavage of the crystals is itself anisotropic behaviour. Justify it.

iii - Diamond is hard and an electrical insulator. Justify it,

iv - Boiling needs a constant supply of heat. Justify it.

v - How the $^{65}_{29}Cu$ can be converted into $^{66}_{30}Zn$.

vi - What is Zeeman effect?

vii - Define Moseley's law and give its relationship/equation.

viii - Define Pauli's exclusion principle.

ix - Define parts per million (PPM) and give its expression.

x - Define critical solution temperature and give an example.

xi - What is catalytic poisoning? Give an example.

xii - Define catalysis and give two examples of catalysed reactions.

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

i - Why the molecules of BF_3 are triangular planar?

ii - Define covalent radius. Give one example.

iii - Define shielding effect. How it varies across the period?

iv - Define coordinate covalent bond. Give one example.

v - Differentiate between endothermic and exothermic reaction.

vi - What is lattice energy? Give one example.

vii - Enthalpy of neutralization of a strong acid and a base is always –57.5 Kcal $mole^{-1}$. Why?

viii - Calculate the oxidation number of chromium in the following compounds:

a) CrO_3 b) Cr_2O_3

ix - Define oxidation state. Give example.

(Turn Over)

(SECTION – II)

Note: Attempt any THREE (3) questions from Section II..

5. (a) Explain the concept of limiting reactant with a suitable example. Also write down steps to identify a limiting reactant. **1+1+2 (4)**
   (b) Define quantum numbers and explain in detail azimuthal quantum number. **1+3 (4)**

6. (a) 250 cm^3 of the sample of hydrogen effuses four times as rapidly as 250 cm^3 of an unknown gas. Calculate the molar mass of unknown gas. **(4)**
   (b) Discuss any two industrial importance of electrolytic process. **(4)**

7. (a) Explain the geometry of NH_3 using hybridization. **3+1 (4)**
   (b) State and explain Hess's law of constant heat summation with an example. **1+3 (4)**

8. (a) Brief about structure of ice. **(4)**
   (b) Calculate the pH of buffer solution in which 0.11 M CH_3COONa and 0.09 M CH_3COOH solutions are present while ka for CH_3COOH is 1.85×10^{-5}. **(4)**

9. (a) What is solubility curve? Discuss its types with examples. **(4)**
   (b) What in catalysis? Give any three characteristics of catalyst with examples. **(4)**

Roll No. of Candidate : _____

CHEMISTRY **(INTERMEDIATE PART - I) 321 - (III)** **Paper - I** **Group - I**

Time: 20 Minutes **OBJECTIVE ----- Code : 6485** **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. Attempt as many questions as given in objective type question paper and leave others blank.

1. 1 - 18 g glucose is dissolved in 90 g of water. The relative lowering of vapour pressure is equal to
(A) $\frac{1}{51}$ (B) $\frac{1}{5}$ (C) 5.1 (D) 6

2 - 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

3 - The crystal system of sulphur is
(A) cubic (B) hexagonal (C) triclinic (D) monoclinic

4 - An excess of aqueous silver nitrate is added to aqueous barium chloride and precipitate is removed by filtration. What are the main ions in the filtrate?
(A) Ag^+ and NO_3^- only (B) Ba^{2+} and NO_3^- only
(C) Ag^+ and Ba^{2+} and NO_3^- (D) Ba^{2+} and NO_3^- and $C\ell^-$

5 - Which of the hydrogen halide has the highest percentage of ionic character ?
(A) $HC\ell$ (B) HBr (C) HI (D) HF

6 - The value of quantum number is $n = 1, 2, 3, 4, 5 \ldots\ldots$ for
(A) principal quantum number (B) azimuthal quantum number
(C) magnetic quantum number (D) spin quantum number

7 - Equal masses of methane and oxygen are mixed in an empty container at 25°C. The fraction of total pressure exerted by oxygen is
(A) $\frac{1}{3}$ (B) $\frac{8}{9}$ (C) $\frac{1}{9}$ (D) $\frac{16}{17}$

8 - Number of isotopes of oxygen is
(A) two (B) three (C) four (D) five

9 - The type of hybridization in NH_3 is
(A) SP (B) SP^2 (C) SP^3 (D) dSP^2

10 - Stronger the oxidizing agent, greater is the
(A) oxidation potential (B) reduction potential (C) redox potential (D) E.M.F. of cell

11 - Law of mass action states that the rate at which the reaction proceeds is directly proportional to the product of the active masses of
(A) reactants (B) products (C) concentration (D) equilibrium

12 - A limiting reactant is the one which
(A) is taken in lesser quantity in grams as compared to other reactants
(B) is taken in lesser quantity in volume as compared to the other reactants
(C) gives the maximum amount of the product which is required
(D) gives the minimum amount of the product under consideration

13 - The comparative rates at which the solutes move in paper chromatography depend on
(A) the size of paper (B) R_f values of solutes
(C) temperature of the experiment (D) size of the chromatographic tank used

14 - One calorie is equivalent to
(A) 0.4184 J (B) 4.184 J (C) 41.84J (D) 418.4 J

15 - Oxygen molecule is heavier than hydrogen by
(A) 1 time (B) 8 times (C) 16 times (D) 32 times

16 - Acetone and chloroform are soluble in each other due to
(A) intermolecular hydrogen bonding (B) ion-dipole interaction
(C) instantaneous dipole (D) all of these

17 - The nature of the positive rays depends on
(A) the nature of electrode (B) the nature of the discharge tube
(C) the nature of the residual gas (D) all of these

CHEMISTRY **(INTERMEDIATE PART-I) 321** **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 - Differentiate between theoretical yield and experimental yield.

ii - Define mole with two examples.

iii - Law of conservation of mass has to be obeyed during stoichiometric calculations. Justify it.

iv - Iodine dissolves readily in $CC\ell_4$. Why?

v - What is chromatography and R_f value?

vi - Calculate S.I. unit of R.

vii - Derive Boyle's law from kinetic molecular theory of gases.

viii - Write down any two characteristics of plasma.

ix - State Charles's law. Write down its mathematical form.

x - Relative lowering of vapour pressure is independent of temperature. Justify this statement.

xi - Define hydration energy of ions.

xii - What are continuous solubility curves? Give one example.

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

i - What is role of hydrogen bonding in paints, dyes, and textile materials?

ii - What do you mean by liquid crystal? Write down any two uses of it.

iii - Define the property of solids allotropy and give two examples.

iv - The crystals showing isomorphism mostly have the same atomic ratios; explain.

v - How neutron was discovered by Chadwick? Also write down reaction.

vi - Write down postulates of Bohr's atomic model.

vii - How azimuthal quantum number (ℓ) gives information about types of subshells?

viii - Explain the concept of atomic spectrum.

ix - Write down optimum conditions of temperature and pressure in the manufacture of ammonia by Haber's process.

x - Define pH and pOH of solutions.

xi - What do you understand by rate determining step? Give a suitable example.

xii - How does Arrhenius equation help us to calculate the energy of activation of a reaction?

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

i - Define ionization potential of element. How ionization potential vary across the period?

ii - Anionic radius is greater than that of its parent atomic radius. Why?

iii - Draw the structure of NH_3 with reference to VSEPR Theory.

iv - How do electronegativity values charge in a group?

v - Define enthalpy of solution with an example.

vi - State first law of thermodynamics. Give its mathematical expression.

vii - Calculate the oxidation numbers of elements underlined:

(a) $Na_2\underline{C}O_3$ (b) $K_2\underline{Mn}O_4$

viii - Give function of salt bridge.

ix - Why SHE acts as cathode when connected with Zn electrode but SHE acts as anode when connected with Cu? Justify.

(Turn Over)

(SECTION – II)

5. (a) When limestone ($CaCO_3$) is roasted then quicklime (CaO) is formed according to the following equation. The actual yield of (CaO) is 2.5 kg, when 4.5 kg of limestone is heated. What is the percentage yield of this reaction? (4)

$$CaCO_{3\,(S)} \xrightarrow{\Delta} CaO_{(S)} + CO_{2(g)}$$

(b) Discuss the role of Hydrogen Bonding in Biological Compounds. (4)

6. (a) Write fundamental postulates of kinetic molecular theory of gases. (4)

(b) Discuss four postulates of Bohr's model of atom. (4)

7. (a) What is Sp^3 hybridization? Explain the structure of methane. (4)

(b) Explain measurement of enthalpy by a glass calorimeter. (4)

8. (a) Calculate the pH of 1.0 mole dm^{-3} of NH_4OH, which is 1% dissociated. (4)

(b) Explain half life method for determination of order of reaction. (4)

9. (a) Freezing points of solutions are depressed when non-volatile solutes are present in volatile solvents. Justify it. Plot a graph to elaborate your answer. (4)

(b) Discuss measurement of electrode potential by standard hydrogen electrode (S.H.E) (4)

Roll No. of Candidate : _____

CHEMISTRY **(INTERMEDIATE PART - I) 321 - (III)** **Paper - I** **Group – II**

Time: 20 Minutes **OBJECTIVE ----- Code : 6486** **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. Attempt as many questions as given in objective type question paper and leave others blank.

1. 1 - An excess of aqueous silver nitrate is added to aqueous barium chloride and precipitate is removed by filtration. What are the main ions in the filterate?

(A) Ag^+ and NO_3^- only (B) Ag^+ and Ba^{2+} and NO_3^-

(C) Ba^{2+} and NO_3^- only (D) Ba^{2+} and NO_3^- and $C\ell^-$

2 - Pressure remaining constant, at which temperature the volume of a gas will become twice of what it is at $0^\circ C$

(A) $546^\circ C$ (B) $200^\circ C$ (C) 546 K (D) 273 K

3 - The number of bonds in nitrogen molecule is

(A) one σ and one π (B) one σ and two π

(C) three sigma only (D) two σ and one π

4 - When water freezes at $0^\circ C$, 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

5 - Isotopes differ in

(A) properties which depend upon mass

(B) arrangement of electrons in orbitals

(C) chemical properties

(D) the extent to which they may be affected in electromagnetic field

6 - 18 g glucose is dissolved in 90 g of water. The relative lowering of vapour pressure is equal to

(A) $\frac{1}{5}$ (B) 5.1 (C) $\frac{1}{51}$ (D) 6

7 - The nature of the positive rays depend on

(A) the nature of electrode (B) the nature of the discharge tube

(C) the nature of the residual gas (D) all of these

8 - The velocity of photon is

(A) independent of its wavelength (B) depends on its wavelength

(C) equal to square of its amplitude (D) depends on its source

9 - One calorie is equivalent to

(A) 0.4184 J (B) 41.84 J (C) 4.184 J (D) 418.4 J

10 - Acetone and chloroform are soluble in each other due to

(A) intermolecular hydrogen bonding (B) ion – dipole interaction

(C) instantaneous dipole (D) all of these

11 - Solvent extraction is an equilibrium process and it is controlled by

(A) law of mass action (B) the amount of solvent used

(C) distribution law (D) the amount of solute

12 - 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

13 - Which of the following species has unpaired electrons in antibonding molecular orbitals?

(A) O_2^{2+} (B) N_2^{-2} (C) B_2 (D) F_2

14 - 27 g of $A\ell$ react completely with how much mass of O_2 to produce $A\ell_2O_3$

(A) 8 g of oxygen (B) 16 g of oxygen (C) 32 g of oxygen (D) 24 g of oxygen

15 - The cathodic reaction in electrolysis of dil. H_2SO_4 with Pt electrodes is

(A) reduction (B) oxidation

(C) both oxidation and reduction (D) neither oxidation nor reduction

16 - The molar volume of CO_2 is maximum at

(A) STP (B) $127^\circ C$ and 1 atm (C) $0^\circ C$ and 2 atm (D) $273^\circ C$ and 2 atm

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

HEMISTRY (INTERMEDIATE PART-I) 321 Paper - I Group - II

ime: 2:40 Hours SUBJECTIVE Marks: 68

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

(SECTION – I)

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

i - What is gram formula? Give example.
ii - Define stoichiometry, write down its two laws.
iii - How limiting reactant is identified?
iv - What is distribution law?
v - What is mobile phase and stationary phase?
vi - What is physical meaning of value of R?
vii - What is Avogadro's law? Give example.
viii - Where plasma is found?
ix - How pressure of dry gas is calculated?
x - Define solubility curve, give its types.
xi - Give two differences between ideal and non-ideal solutions.
xii - What is fractional crystallization?

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

i - Explain cleavage plane is anisotropic property.
ii - Amorphous solids like glass are also called super cooled liquids. Explain.
iii - Define isomorphism by giving one example.
iv - Explain why HF is weak acid than HI?
v - Define Zeeman effect and stark effect.
vi - State Heisenberg's uncertainty principle, write down its mathematical form.
vii - What is spin quantum number? Give its significance.
viii - What is difference between orbit and orbital?
ix - Write down equilibrium constant expression for the reaction:

$$PCl_{5\,(g)} \rightleftharpoons PCl_{3\,(g)} + Cl_{2\,(g)}$$

x - Calculate pH of 0.001 M HCl solution.
xi - Explain the radioactive decay is 1st order reaction.
xii - Justify the statement "the unit of rate constant of a second order reaction is $dm^3\ mole^{-1}\ s^{-1}$ but the unit of rate of reaction is mole $dm^{-3}\ s^{-1}$."

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

i - Name the four factors affecting ionization energies.
ii - Why ionization energy decreases down the group inspite of the increase in proton number?
iii - Why second ionization energy is higher than first ionization energy?
iv - Define electron affinity with an example.
v - Define first law of thermodynamics.
vi - Define heat and work.
vii - Calculate oxidation state of chromium in dichromate ion.
viii - What is the use of salt bridge in voltaic cell?
ix - Why voltaic cell is a reversible cell?

(Turn Over)

(SECTION – II)

5. (a) Calculate the gram atoms (moles) in (4)
   (i) 0.1 g of sodium (ii) 0.1 kg of silicon
   (b) Explain the following properties of crystalline solids. Give two examples in each case: (4)
   (i) Isomorphism (ii) Transition Temperature

6. (a) Derive an equation to find out the partial pressure of a gas knowing the individual moles of component gases and the total pressure of the mixture. (4)
   (b) Give the postulates of Bohr's atomic model. Which postulate tells us that orbits are stationary and energy is quantized? (4)

7. (a) Define electron affinity. Name the factors affecting on it. How does it vary in the periodic table. (4)
   (b) State first law of thermodynamics. Write down its mathematical expression. Prove that $\Delta H = q_p$ (4)

8. (a) What is the percentage ionization of acetic acid in a solution in which 0.1 mol of it has been dissolved per dm^3 of the solution. ($Ka = 1.85 \times 10^{-5}$) (4)
   (b) Explain half life method and large excess method to find the order of reaction. (4)

9. (a) Freezing points of solutions are depressed when non-volatile solutes are present in volatile solvents. Justify it. Plot a graph to elaborate your answer. (4)
   (b) Write down the various rules for assigning oxidation number. (4)

Roll No. of Candidate: _____

Chemistry (New Scheme) **(INTERMEDIATE PART-I) 319-(IV)** **Group: I** **Paper: I**
Time: 20 Minutes **OBJECTIVE** **Marks: 17**
Code: 6487

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. Attempt as many questions as given in objective type question paper and leave other blank.

1.

1. 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
2. Calorie is equivalent to:
   A) 0.4184 J B) 41.84 J C) 4.184 J D) 418.4 J
3. Stronger the oxidizing agent greater is the:
   A) oxidation potential B) reduction potential C) redox potential D) E.M.F of cell
4. Which of the halogen halides has the highest percentage of ionic character:
   A) HCℓ B) HBr C) HF D) HI
5. A solution of glucose is 10% w/v the volume in which one gm mole is dissolved will be:
   A) 1 dm^3 B) 1.8 dm^3 C) 200 cm^3 D) 900 cm^3
6. In order to raise the boiling point of water upto 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
7. Which of the following molecules has zero dipole moment:
   A) NH_3 B) $CHCl_3$ C) H_2O D) BF_3
8. If absolute temperature of a gas is doubled and pressure is reduced to one half, the volume of a gas will:
   A) remain unchanged B) increase four times C) reduced to $\frac{1}{4}$ D) be doubled
9. The pH of 10^{-3} $mol.dm^{-3}$ of aqueous solution of H_2SO_4 is:
   A) 3.0 B) 2.7 C) 2.0 D) 1.5
10. 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
11. Bohr's model of atom is contradicted by:
    A) Plancks quantum theory B) dual nature of matter
    C) Heisenberg's uncertainty principle D) all of the above
12. Solvent extraction is an equilibrium process and it is controlled by:
    A) law of mass action B) the amount of solvent used
    C) distribution law D) the amount of solute
13. The nature of positive rays depend on:
    A) nature of electrode B) nature of residual gas
    C) nature f discharge tube D) all of the above
14. 27 gms of Aℓ will react completely with how much mass of O_2 to produce $Aℓ_2O_3$
    A) 8.0 g of oxygen B) 16.0 g of oxygen C) 32.0 g of oxygen D) 24.0 g of oxygen
15. The molarity of pure H_2O is:
    A) 1 B) 18 C) 55.5 D) 6
16. The mass of one mole of electrons is:
    A) 1.008 mg B) 0.55 mg C) 0.184 mg D) 1.673 mg
17. When water freezes at 0°C its density decreases due to:
    A) cubic structure of ice B) change of bond length
    C) empty spaces present in the structure of ice D) changes of bond angles

Chemistry (New Scheme) **(INTERMEDIATE PART-I) 319** **Group: I** **Paper: 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 × 8 = 16)**

i. Why most of the elements have fractional atomic mass?
ii. Differentiate between "Molecular Formula" and "Empirical Formula".
iii. Why 80 g of glucose and 342 g of suscrose have same number of molecules but different number of atoms?
iv. Write down four properties of best solvent choosen for crystallization.
v. Differentiate between adsorption and partition chromatography.
vi. Define critical temperature and critical pressure.
vii. Calculate the S.I units of 'R'.
viii. Define plasma. How it is formed?
ix. Why gases show Non-Ideal behavior at low temperature and high pressure?
x. Write two differences between Ideal and Non-Ideal solutions.
xi. Define Heat of solution. Give example.
xii. Why aqueous solution of CH_3COONa is basic?

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

i. Define vapour pressure. Name the factors which affect vapour pressure.
ii. What are dipole-dipole forces. Name the properties which are affected by these forces.
iii. Define Anisotropy and Allotropy.
iv. Boiling point of water is high as compared to boiling point of ether. Why?
v. State Moseley's Law. Give its two importances.
vi. Justify that the distance gaps between different orbits go on increasing from the lower to the higher orbits.
vii Why are positive rays called canal rays?
viii. Draw shapes of 'S' and 'P' orbitals.
ix. Define common ion effect giving an example.
x. State law of Mass Action.
xi. Define order of reaction. Give an example of pseudo first order reaction.
xii. Write two properties of enzyme catalysis.

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

i. Define octet rule. Give two examples.
ii. Atomic Radii increase in group and decrease in period, explain it.
iii. Cationic radius is smaller than parent atom, give reason.
iv. How electronegativity is used to find nature of chemical bond.
v. Define exothermic reaction. Give two examples.
vi. Define Spontaneous process. Give two examples.
vii. Find oxidation number of "Mn in $KMnO_4$"
viii. Explain electrolysis of fused $PbCl_2$.
ix. Write the function of salt bridge in Galvanic cell.

(Turn Over)

Roll No. of Candidate: _____

Chemistry (New Scheme) **(INTERMEDIATE PART-I) 319 – (IV)** **Group: II** **Paper: I**
Time: 20 Minutes **OBJECTIVE** **Marks: 17**
Code: 6488

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. Attempt as many questions as given in objective type question paper and leave other blank.

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

2. The molar volume of CO_2 is maximum at:
A) S.T.P B) 127 °C and 1 atm C) 0 °C and 2 atm D) 273 °C and 2 atm

3. Splitting of spectral lines when the atoms are subjected to strong electric field is called:
A) zee-man effect B) stark effect C) photo electric effect D) Compton effect

4. Molarity of pure water is:
A) 1.0 B) 18.0 C) 55.5 D) 6.0

5. Orbitals having same energy are called:
A) hybrid orbitals B) valence orbitals C) degenerate orbitals D) d-orbitals

6. 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

7. Calorie is equivalent to:
A) 0.418 J B) 41.84 J C) 4.184 J D) 418.4 J

8. Solvent extraction is an equilibrium process and is controlled by:
A) law of mass action B) distribution law
C) amount of solvent used D) the amount of solute

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

10. 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

11. Which of the following is a pseudo solid?
A) CaF_2 B) glass C) NaCl D) all of these

12. Stronger the oxidizing agent, greater is the:
A) oxidation potential B) reduction potential C) redox potential D) E.M.F of cell

13. Which of the following species has unpaired electrons in the anti-bonding molecular orbitals:
A) O_2^{2+} B) N_2^{2-} C) B_2 D) F_2

14. Pressure remaining constant, at which temperature, the volume of gas will become twice of what it is at 0 °C :
A) 546 °C B) 200 °C C) 546 K D) 273 K

15. Ionic solids are characterized by:
A) low melting points B) high vapour pressures
C) good conductivity in solid state D) solubility in polar solvents

16. Which of the following molecules has zero dipole moment:
A) NH_3 B) $CHCl_3$ C) H_2O D) BF_3

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

(SECTION – II)

5.	(a)	Write a note on Limiting reactant. Explain it giving at least two examples.	4
	(b)	Write four important properties of Metallic solids.	4
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 gas at low temperature.	4
	(b)	Write down any four properties of positive rays.	4
7.	(a)	Explain postulates of molecular orbital theory.	4
	(b)	Derive the relationship between ΔH and ΔE, where H stands for enthalpy and E stands for internal energy. Which are two conditions when ΔH and ΔE becomes equal.	4
8.	(a)	Ca $(OH)_2$ is a sparingly soluble compound. Its solubility product is 6.5×10^{-6}. Calculate the solubility of $Ca(OH)_2$.	4
	(b)	Describe any four physical methods for the determination of the rate of a chemical reaction.	4
9.	(a)	Give graphical explanation for Elevation of boiling point of a solution.	4
	(b)	Explain four Industrial applications of Electrolysis.	4

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. Attempt as many questions as given in objective type question paper and leave others blank.

1. 1 - Hydrolysis of tertiary butyl bromide is
(A) zero order reaction (B) first order reaction
(C) pseudo first order reaction (D) second order reaction

2 - 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

3 - The solubility product of $AgC\ell$ is 2.0×10^{-10} mol^2 dm^{-6}. The maximum concentration of Ag^+ ions in solution is
(A) 2.0×10^{-10} mol dm^{-3} (B) 1.41×10^{-5} mol dm^{-3}
(C) 1.0×10^{-10} mol dm^{-3} (D) 4.0×10^{-20} mol dm^{-3}

4 - For the reaction $NaOH + HC\ell \longrightarrow NaC\ell + H_2O$ the change in enthalpy is called
(A) heat of neutralization (B) heat of reaction
(C) heat of formation (D) heat of combustion

5 - Which of the hydrogen halides has the highest percentage of ionic character?
(A) $HC\ell$ (B) HBr (C) HF (D) HI

6 - The velocity of photon
(A) is independent of wavelength (B) depends upon its wavelength
(C) equals to square of its amplitude (D) depends on its source

7 - Which of the following is pseudo solid
(A) CaF_2 (B) glass (C) $NaC\ell$ (D) KBr

8 - 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 experiment (D) size of chromatographic tank used

9 - The number of moles of CO_2 which contain 8.0g of oxygen.
(A) 0.25 (B) 0.50 (C) 1.0 (D) 1.50

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

11 - The molar volume of CO_2 is maximum at
(A) STP (B) 0^oC and 2atm (C) 127^oC and 1atm (D) 273^oC and 2atm

12 - The boiling point of water at Murree hill is
(A) 99.8^oC (B) 98^oC (C) 100^oC (D) 89^oC

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

14 - Which of the following molecules has zero dipole moment?
(A) NH_3 (B) $CHC\ell_3$ (C) H_2O (D) CS_2

15 - Optimum temperature for synthesis of ammonia by Haber Process is
(A) 370^oC (B) 390^oC (C) 400^oC (D) 410^oC

16 - 18g glucose is dissolved in 90g of water, the relative lowering of vapour pressure is
(A) $\frac{1}{5}$ (B) 5.1 (C) $\frac{1}{51}$ (D) 6

17 - If salt bridge is not used between two half cells then the voltage.
(A) decreases rapidly (B) decreases slowly (C) does not change (D) drops to zero

CHEMISTRY (New Scheme) **(INTER PART - I) 318** **Paper - 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 - One mole of H_2SO_4 should completely react with two moles of NaOH. How does Avogadro's number help to explain it?

ii - How does one mole of H_2O contain 2 moles of bonds, 3 moles of atoms, 10 moles of electrons and 20 moles of total fundamental particles?

iii - How N_2 and CO have same number of electrons, protons and neutrons?

iv - Write four characteristics of an ideal solvent used in solvent extraction.

v - Differentiate between partition chromatography and adsorption chromatography.

vi - Why are H_2 and He ideal at room temperature but SO_2 and $C\ell_2$ non-ideal at room temperature?

vii - Why is the plot of PV verses P a straight line at constant temperature and with a fixed number of moles of ideal gas?

viii - Why do water vapours not behave ideally at 273 K?

ix - What effect will be observed when we change pressure, on the production of NH_3 and SO_3 by following reactions:

$$N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$$

$$2SO_2(g) + O_2(g) \rightleftharpoons 2SO_3(g)$$

x - What will be the nature of solution having pH equal to 12?

xi - What is buffer capacity?

xii - Write the relationship of pH and pOH with pK_w.

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

i - Graphite is good conductor of electricity but diamond is bad conductor of electricity. Give reason.

ii - Define symmetry and habit of crystal.

iii - Define lattice energy. Give an example.

iv - Explain electron gas theory for metallic bond.

v - Why does lone pair of electrons occupy more space as compared to bond pair?

vi - Why does Helium not exist in the form of He_2?

vii - Electronegativity difference between the bonded atoms is an index to the polar nature of covalent bond, justify.

viii - Why is MOT superior to VBT?

ix - What is non-spontaneous process? Give two examples.

x - Why is it necessary to mention the physical states of reactants in a thermochemical reactions?

xi - Differentiate between ideal and non-ideal solutions.

xii - Define colligative properties. Why are they so called?

(Trun Over)

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

i - Why is it necessary to decrease the pressure in the discharge tube to get the cathode rays?

ii - What is atomic emission spectrum?

iii - Write down the importance of Moseley's law.

iv - Distribute electrons in the orbitals of

a) $_{29}Cu$ b) $_{55}Cs$

v - Write down the difference between ionization and electrolysis.

vi - Impure Cu can be purified by electrolytic process. Give reasons.

vii - Differentiate between electrolytic cell and voltaic cell.

viii - Rate of chemical reaction is an ever changing parameter under the given conditions. Justify the statement.

ix - The sum of the co-efficients of a balanced chemical equation is not necessarily important to give the order of reaction. Give reasons in support of your answer.

(SECTION – II)

5. (a) An unknown metal 'M' reacts with S to form a compound with a formula M_2S_3 if 3.12 g of 'M' reacts with exactly 2.88 g of sulphar. What are the names of metal 'M' and the compound M_2S_3? **(4)**

(b) Define evaporation. Explain any three factors affecting evaporation rate. **(1+3)**

6. (a) State Graham's law of diffusion. Give its experimental verification. **(4)**

(b) Derive an expression to calculate the radius of revolving electron in nth orbit by Bohr's model of atom. **(4)**

7. (a) Define electron affinity. Give its trend in the periodic table. Also mention abnormal behaviour of electron affinity in different groups. **(4)**

(b) Define enthalpy. Prove $q_p = \Delta H$. **(4)**

8. (a) How can you predict the followings with the help of equilibrium constant (K_C) of reversible reaction: **(4)**

i) Direction of a reaction ii) Extent of a reaction

(b) i) Give explanation of electrolysis of fused sodium chloride. **(4)**

ii) Explain electrolytic method for the production of caustic soda on industrial scale.

9. (a) The boiling point of a solution containing 0.2g of a substance 'A' in 20.0 g of ether (molar mass = 74) is 0.17 K higher than that of pure ether. Calculate the molar mass of 'A'. Molal boiling point constant of ether is 2.16 K. **(4)**

(b) Name various factors affecting rate of reactions. Explain any one. **(4)**