

1121 (Inter Part - I) Warning:- Please, do not write anything on this question paper except your Roll No.  
**Chemistry** (Subjective) (Session 2017-19 to 2020-22) **Group (I)** **Paper (I)**

Time Allowed: 2.40 hours **Section ----- I** Maximum Marks: 68  
**Answer briefly any Eight parts from the followings:- 540-61-21**  $8 \times 2 = 16$

- (i) Justify the statement 23g sodium and 238g of uranium have equal no of atoms.
- (ii) Magnesium atom is twice heavier than that of carbon atom.
- (iii) 180 g glucose and 342g of sucrose have same number of molecules but different number of atoms present in them.
- (iv) What is difference between partition and adsorption type of chromatography.
- (v) Define sublimation by giving one example.
- (vi) State charless law by giving its mathematical expression.
- (vii) Do you think that some of the postulates in kinetic molecular theory of gases are faulty? Point out these postulates. (viii) State Avogadro's law of gases?
- (ix) Where is plasma found?
- (x) Define fractional crystallization by giving one example.
- (xi) Why  $Na_2SO_4 \cdot 10H_2O$  shows discontinuous solubility curve.
- (xii) Define colligative properties.

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

- (i) Define dipole-dipole forces with one example.
- (ii) What is dipole-induced dipole force? (iii) Define London dispersion forces.
- (iv) Why methane is gas while hexane is a liquid.
- (v) Define spectrum. (vi) What is Stark effect? (vii) Define Heisenberg's uncertainty principle.
- (viii) Define atomic orbital. (ix) Define the Le Chatelier's principle.
- (x) Why catalyst does not affect the equilibrium position.
- (xi) Define order of reaction. (xii) What is half life period.

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

- (i) Define ionization energy and electron affinity with one example in each case.
- (ii) Write the Lewis Structures for the following compounds.  
(a) HCN (b)  $CCl_4$
- (iii) Define hybridization. What type of hybridization is found in  $CH_4$ ?
- (iv) Write down four postulates of VSEPR Theory.
- (v) Define the following with one example in each case.  
(a) Standard enthalpy of reaction. (b) Standard enthalpy of combustion.
- (vi) Differentiate between internal energy of the system and the enthalpy of the system.
- (vii) Why the standard oxidation potential of Zn is +0.76 V and its reduction potential is -0.76 V?
- (viii) Why the equilibrium is set up between metal atoms of electrode and ions of metal in a cell?
- (ix) Why a salt bridge maintains the electrical neutrality in the cell?

**Section ----- II**

**Note: Attempt any three questions.**

$(8 \times 3 = 24)$

5. (a) Calculate the masses of  $10^{-3}$  moles of  $MgSO_4$  and 2.74 moles  $KMnO_4$ .  
(b) Describe any four crystal systems.
6. (a) Write down eight postulates of Kinetic molecular theory of gases.  
(b) Derive the equation for the radius of  $n^{th}$  orbit of hydrogen atom using Bohr's model.
7. (a) Define ionization energy. Name the factors on which it depends. Also explain its trends in the periodic table.  
(b) Define enthalpy and prove that  $\Delta H = q_p$ .
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 ( $K_a = 1.85 \times 10^{-5}$ )  
(b) What is Arrhenius Equation? How can you calculate the energy of activation of a reaction from this equation.
9. (a) Briefly explain the working of Galvanic Cell.  
(b) Explain Beckmann method to determine depression of Freezing Point.

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Chemistry (Objective)

( Group - I ) 840-6121 Paper (I)

Time Allowed:- 20 minutes

PAPER CODE 2481

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) Isotopes differ in the presence of  
(A) Electrons (B) Protons (C) Neutrons (D) Positrons
- 2) Average atomic mass of Neon is  
(A) 20.81 (B) 21.81 (C) 22.18 (D) 20.18
- 3) The rate at which solutes move in paper chromatography depend on  
(A) Size of paper (B)  $R_f$  values of solutes (C) Temperature (D) Pressure
- 4) Kinetic energy of gas molecules is zero at  
(A)  $0C^\circ$  (B)  $0F^\circ$  (C)  $0k$  (D)  $-10C^\circ$
- 5) The number of molecules of water in one  $dm^3$  is close to  
(A)  $\frac{6.02}{22.4} \times 10^{23}$  (B)  $18 \times 10^{23}$  (C)  $\frac{12.04}{22.4} \times 10^{23}$  (D)  $55.6 \times 6.02 \times 10^{23}$
- 6) The number of unit cell parameters are  
(A) 2 (B) 4 (C) 6 (D) 8
- 7) The maximum boiling point of  $NH_3$  among the hydrides of group V is due to  
(A) Small size of N atom (B) Lone pair of electron (C) Enhanced electro negative character of Nitrogen (D) Pyramidal shape of  $NH_3$
- 8) Splitting of spectral lines in a strong Electric field is called  
(A) Zeeman effect (B) Stark effect (C) Compton effect (D) Photoelectric effect
- 9) Bohr Model of atom is contradicted by  
(A) Plank's quantum Theory (B) Dual nature (C) Heisen berg's principle (D) Pauli's exclusion principle
- 10) The number of bonds in oxygen molecule is  
(A) Two  $\sigma$  bonds (B) Two  $\pi$  bonds (C) one  $\sigma$ , one  $\pi$  (D) one  $\sigma$ , Two  $\pi$
- 11) Bond order of Helium molecule is  
(A) Zero (B) One (C) Two (D) Three
- 12) Which of these is not a state function.  
(A) Temperature (B) Pressure (C) Volume (D) Heat
- 13) How much nitrogen fixation is carried out by Haber's process.  
(A) 13% (B) 35% (C) 50% (D) 73%
- 14) The value of  $pK_w$  at  $25^\circ C$  for water is  
(A)  $10^{-7}$  (B) 7 (C)  $10^{-14}$  (D) 14
- 15) 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
- 16) Stronger the oxidizing agent, greater is the  
(A) Oxidation potential (B) Reduction potential (C) Redox potential (D) E.M.F. of cell
- 17) In Zero order reaction the rate is independent of  
(A) Temperature (B) Pressure (C) Concentration (D) Volume

1191-- 1121ALP-- 24000 (1)



1121 Warning:- Please write your Roll No. in the space provided and sign. Roll No-----  
( Inter Part – I) (Session 2017-19 to 2020-22) Sig. of Student -----

Chemistry (Objective)

( Group - II ) **540-62-2** 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.

Q. 1

- 1) If the salt bridge is not used between two half cells, then the voltage  
(A) Decrease rapidly (B) Decrease slowly (C) Does not change (D) Drops to zero
- 2) If the rate equation of a reaction  $2A + B \longrightarrow$  products is,  $\text{rate} = k[A]^2[B]$  and A is present in large excess, then order of reaction is  
(A) 1 (B) 2 (C) 3 (D) 1.5
- 3) The angle between sides 'b' and 'c' is \_\_\_\_\_  
(A) Beta (B) Alpha (C) Theta (D) Gamma
- 4) 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
- 5) The number of atoms in 1.79 g of gold and \_\_\_\_\_ g of sodium are equal.  
(A) 0.023 (B) 23 (C) 230 (D) 2300
- 6) The comparative rates at which the solutes move in paper chromatography depend on  
(A)  $R_f$  values of solutes (B) The size of paper (C) Temperature of the experiment (D) Size of the chromatographic tank used
- 7) Equal masses of methane and oxygen are mixed in an empty container at  $25^\circ\text{C}$ . The fraction of total pressure exerted by methane is  
(A)  $\frac{1}{3}$  (B)  $\frac{2}{3}$  (C)  $\frac{1}{9}$  (D)  $\frac{8}{9}$
- 8) The molar volume of  $\text{CO}_2$  is maximum at  
(A)  $127^\circ\text{C}$  and 1 atm (B)  $0^\circ\text{C}$  and 2 atm (C) S.T.P (D)  $273^\circ\text{C}$  and 2 atm
- 9) Intermolecular forces present in ammonia are \_\_\_\_\_  
(A) Hydrogen bonding (B) Ion-dipole forces (C) Dipole-induced dipole forces (D) London-dispersion forces
- 10) Quantum number values for '3d' orbitals will be  
(A)  $n=3, \ell=0$  (B)  $n=3, \ell=1$  (C)  $n=3, \ell=2$  (D)  $n=3, \ell=3$
- 11) Orbitals having same energy are called  
(A) Valence orbitals (B) Hybrid orbitals (C) d-orbitals (D) Degenerate orbitals
- 12) Bond order of helium molecule is \_\_\_\_\_.  
(A) Two (B) One (C) Zero (D) Three
- 13) Berylliumdichloride follows \_\_\_\_\_ hybridization  
(A) sp (B)  $sp^3$  (C)  $sp^2$  (D)  $sp^3d^2$
- 14) The Born-Haber cycle is the application of \_\_\_\_\_ law.  
(A) Hess's (B) Le-chatlier (C) Coulomb (D) Pascal
- 15) The pH of  $0.001 \text{ mol dm}^{-3}$  of an aqueous solution of  $\text{H}_2\text{SO}_4$  is  
(A) 3 (B) 2.7 (C) 2.0 (D) 1.5
- 16) The pH of human blood is maintained at \_\_\_\_\_.  
(A) 7 (B) 7.35 (C) 7.95 (D) 8.00
- 17) 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

1193-- 1121 ALP -- 12000 (4)

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**Chemistry** (Subjective) (Session 2017-19 to 2020-22) **Group (II)** **Paper (I)**

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

2. **Answer briefly any Eight parts from the followings:-** *360-62-21*  $8 \times 2 = 16$

- (i) Justify that 180 g of glucose and 342 g of sucrose have the same number of molecules but different number of atoms present in them. (ii) Define isotopes. Give one example.
- (iii) What is gram atom? How we can calculate gram atom of an element? Give its relationship.
- (iv) What is chromatography? Write its two uses. (v) Define sublimation. Write two solids which can be sublimed.
- (vi) Differentiate between natural and artificial Plasma.
- (vii) Derive the units for gas constant R in general gas equation when the pressure is in atmosphere and volume in  $\text{dm}^3$ .
- (viii) Verify Boyle's law from kinetic theory of gases.
- (ix) Write two applications of Dalton's law of partial pressure.
- (x) Define solubility. How it can be expressed? (xi) What is discontinuous solubility curve. Give one example.
- (xii) How do you Justify that freezing points are depressed due to the presence of solutes.

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

- (i) Why in a very cold winter the fish in gardens ponds owe their lives to hydrogen bonding?
- (ii) Why water and ethanol can mix easily and in all proportions.
- (iii) Define unit cell. Give one example. (iv) Define transition temperature. Give one example.
- (v) What is hydrogen spectrum. Name four spectral lines.
- (vi) Write down two defects in Bohr's atomic model.
- (vii) Whichever gas is used in discharge tube, the nature of the cathode rays remains the same. Why?
- (viii) Give any two properties of cathode rays. (ix) Define (a) Reversible reactions (b) state of equilibrium.
- (x) Define Buffer capacity. (xi) Define instantaneous and average rates of reaction
- (xii) Define specific rate constant or velocity constant.

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

- (i) Differentiate between polar and non polar covalent bond.
- (ii) Explain the formation of co-ordinate covalent bond between  $\text{NH}_3$  &  $\text{BF}_3$
- (iii) Explain the geometry of  $\text{H}_2\text{S}$  molecule on the basis of VSEPR theory.
- (iv) How ionization energy varies in the periodic table.
- (v) Define standard enthalpy of formation with two examples.
- (vi) Differentiate between atomization energy and Lattice energy.
- (vii) How electrochemical series helps to predict the feasibility of a chemical reaction? Give an example.
- (viii) Write the function of salt bridge in Galvanic cell.
- (ix) Differentiate between Galvanic cell and electrolytic cell.

**Section ----- II**

Note: **Attempt any three questions.**  $(8 \times 3 = 24)$

5. (a) Calculate the number of grams of  $\text{K}_2\text{SO}_4$  and water produced when 14 gram of KOH are reacted with excess of  $\text{H}_2\text{SO}_4$ . Also calculate the number of molecules of water produced.  
(b) How does hydrogen bonding explains the following  
(i) Structure of DNA (ii) Structure of Ice.
6. (a) Write down the postulates of Kinetic molecular theory of gases.  
(b) Explain Millikan's oil drop experiment to determine the charge of an electron.
7. (a) Draw and discuss the geometry of Ethylene with respect to  $\text{sp}^2$ -hybridization.  
(b) How can you measure enthalpy of reaction by glass calorimetric method.
8. (a) The following reaction was allowed to reach the state of equilibrium  
 $2\text{A}_{(\text{aq})} + \text{B}_{(\text{aq})} \rightleftharpoons \text{C}_{(\text{aq})}$  the initial amount of the reactants present in one  $\text{dm}^3$  of solution were 0.50 moles of A and 0.60 moles of B. At equilibrium the amounts were 0.20 moles of A and 0.45 moles of B and 0.15 moles of C. Calculate the equilibrium constant  $K_c$ .  
(b) Define half life period. Explain with two examples.
9. (a) Give differences between Ideal and Non-Ideal solution.  
(b) Write different rules for assigning oxidation number by giving one example.

1194- 1121 ALP -- 12000