

<b>Chemistry</b>	<b>Lahore Board 2015</b>	<b>Inter Part-I Group – I</b>
<b>Time: 20 Min.</b>	<b>Objective Type</b>	<b>Marks = 17</b>

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

- 1.1** Which of the following has zero dipole moment:  
 (A)  $\text{NH}_3$  (B)  $\text{BF}_3$   
 (C)  $\text{H}_2\text{O}$  (D)  $\text{H}_2\text{S}$
- 2.** An excess of aqueous  $\text{AgNO}_3$  is added to aqueous  $\text{BaCl}_2$  solution. The precipitate is removed off. The filtrate contains :  
 (A)  $\text{Ag}^+$  and  $\text{NO}_3^-$  ions (B)  $\text{Ag}^+$ ,  $\text{Ba}^{+2}$  and  $\text{NO}_3^-$  ions  
 (C)  $\text{Ba}^{+2}$  and  $\text{NO}_3^-$  only (D)  $\text{Ba}^{+2}$ ,  $\text{NO}_3^-$  and  $\text{Cl}^-$  ions
- 3.** In dry ice  $\text{CO}_2$  molecules form :  
 (A) Ionic crystals (B) Covalent crystals  
 (C) Molecular crystals (D) Any type of crystals
- 4.** Molarity of pure water is :  
 (A) 1 (B) 18  
 (C) 6 (D) 55.5
- 5.** Orbitals having same energy are called :  
 (A) Hybrid orbitals (B) Valence orbitals  
 (C) Degenerate orbitals (D) d-orbitals
- 6.** In  $\text{H}_2\text{SO}_4$  the oxidation number of S is :  
 (A) +2 (B) +6  
 (C) +8 (D) +4
- 7.** Pressure remaining constant at which temperature the volume of a gas will become twice of what it is at  $0^\circ\text{C}$  :  
 (A)  $546^\circ\text{C}$  (B)  $200^\circ\text{C}$   
 (C)  $546\text{ K}$  (D)  $273\text{ K}$
- 8.** Volume occupied by 1.4 g of  $\text{N}_2$  at S.T.P. is :  
 (A)  $2.24\text{ dm}^3$  (B)  $22.4\text{ dm}^3$   
 (C)  $1.12\text{ dm}^3$  (D)  $112.0\text{ cm}^3$
- 9.** Which of the following has highest bond energy :  
 (A) HI (B) HBr  
 (C) HCl (D) HF
- 10** The pH of  $10^{-3}$  molar  $\text{H}_2\text{SO}_4$  solution is :  
 (A) 3.0 (B) 2.7  
 (C) 2.0 (D) 1.5
- 11** When 6 d orbital is complete the entering electron goes to :  
 (A) 7 f (B) 7 s  
 (C) 7 p (D) 7 d
- 12** At what external pressure the boiling point of water will be  $110^\circ\text{C}$  :  
 (A) Any value of pressure  
 (B) 765 torr  
 (C) Between 200 torr and 760 torr  
 (D) Between 760 torr and 1200 torr
- 13** In solvent extraction the law applied is :  
 (A) Law of mass action (B) Distribution law  
 (C) Coulomb's law (D) Boyle's law
- 14** The volume of one mole  $\text{CO}_2$  is maximum at :  
 (A) S.T.P (B)  $127^\circ$  and 1 atm.  
 (C)  $0^\circ\text{C}$  and 2 atm. (D)  $273^\circ\text{C}$  and 2 atm.
- 15** One calorie is equal to :  
 (A) 4.184 J (B) 0.4184 J  
 (C) 41.84 J (D) 418.4 J
- 16** The rate of reaction :  
 (A) Increases as the reaction proceeds  
 (B) Decreases as the reaction proceeds  
 (C) Remains the same as reaction proceeds  
 (D) May decrease or increase as the reaction proceeds
- 17** The number of carbon atoms in 22.0 g of  $\text{CO}_2$  is :  
 (A)  $3.01 \times 10^{23}$  (B)  $6.02 \times 10^{23}$   
 (C)  $3.01 \times 10^{22}$  (D)  $6.02 \times 10^{22}$

<b>Chemistry</b>	<b>Lahore Board 2015</b>	<b>Inter Part-I Group – I</b>
<b>Time: 3.10 hrs</b>	<b>Essay Type</b>	<b>Marks = 83</b>

### SECTION – I

- 2. Write short answers to any EIGHT (8) questions: 16**
- Actual yield is usually less than the theoretical yield. Give reasons.
  - A compound may have same empirical as well as molecular formula. Justify.
  - What is Avogadro's number? Give equation to relate the Avogadro's number and mass of an element.
  - Define sublimation. What type of a substance can be purified by this technique?
  - What is difference between qualitative analysis and quantitative analysis?
  - Write down the faulty postulates of kinetic molecular theory of gases.
  - What is plasma state? How is plasma formed at high temperature?
  - Explain the term enthalpy of atomization.
  - What is lattice energy? Give an example.
  - How the direction of a reversible reaction at any instant can be determined by  $K_c$  value?
  - State Le-Chatelier's principle and discuss the effect of change in concentration of a product on reversible reaction.
  - A weak acid has strong conjugate base. Justify.
- 3. Write short answers to any EIGHT (8) questions : 16**
- Why different liquids evaporate at different rates even at the same temperature?
  - How the liquid crystals help in the detection of the blockage in veins and arteries?
  - Why ionic crystals are highly brittle?
  - What is the relationship between polymorphism and allotropy?
  - What are defects in Rutherford's atomic model?
  - Justify that the distance gaps between different orbitals go on increasing from the lower to higher orbits.
  - Define Zeeman's effect and Stark effect.
  - State Pauli Exclusion Principle and Hund's rule.
  - How the nature of a chemical bond is predicted with the help of electronegativity values of two bonded atoms?
  - No bond in chemistry is 100% ionic. Justify it.
  - The bond angles of  $H_2O$  and  $NH_3$  are not  $109.5^\circ$  like that of  $CH_4$  although oxygen and nitrogen atoms are  $sp^3$  - hybridized. Why?
  - Explain the term bond order.
- 4. Write short answers to any SIX (6) questions : 12**

- Why the  $NaCl$  and  $KNO_3$  are used to lower the melting point of ice?
- Define upper consolute temperature with example.
- Define hydrolysis with example.
- Voltaic cell is reversible cell, State.
- How fuel cells produce electricity?
- Calculate oxidation number of chromium in  $CrCl_3$ .
- The sum of the coefficients of a balanced chemical equation is not necessarily important to give the order of reaction justify.
- Define homogenous catalysis, give two examples.
- What is catalytic poisoning? Give two examples.

### SECTION-II

**Note: Attempt any THREE questions.**

- 5. (a)** What are molecular solids? Give examples and explain their properties. 4
- (b)** A mixture of two liquids, hydrazine  $N_2H_4$  and  $N_2O_4$  are used in rockets. They produce  $N_2$  and water vapours. How many grams of  $N_2$  gas will be formed by reacting 100 g of  $N_2H_4$  and 200 g of  $N_2O_4$  :  $(2N_2H_4 + N_2O_4 \rightarrow 4H_2O + 3N_2)$  4
- 6. (a)** How volume and pressure were corrected by Vander Waals? 4
- (b)** Discuss magnetic and spin quantum numbers. 4
- 7. (a)** Explain important points of molecular orbital theory and draw structure of nitrogen ( $N_2$ ) molecule according to this theory. 4
- (b)** Define the following with example : 4
- System.
  - Non-spontaneous reactions.
  - Surrounding.
  - Endothermic reactions.
- 8. (a)** Explain any four characteristics of a catalyst. 4
- (b)** Benzoic acid  $C_6H_5COOH$  is a weak mono-basic acid ( $K_a = 6.4 \times 10^{-5} \text{ mol dm}^{-3}$ ). What is the PH of a solution containing 7.2 g of sodium benzoate in one  $dm^3$  of 0.02 mole  $dm^{-3}$  benzoic acid? 4
- 9. (a)** Describe one method to determine the boiling point elevation of a solution. 4
- (b)** Explain the construction and working of fuel cell. 4

### SECTION — III (Practical Part)

**Note: (i) Attempt any THREE questions.**

- Write down material required, diagram and procedure for Part A and B. 1,1,3
- Write down standard solution, chemical equation with mole ratio, indicator with end point, procedure and supposed readings with calculations for Part C, D, and E. 1,1,1,1,1

- A.** Separate a mixture of inks by paper chromatography. 5
- B.** Purify benzoic acid by water solution. 5
- C.** 4 g of impure KOH are dissolved in 500  $cm^3$  solution. Find out %age purity. 5
- D.** 5 g of impure  $KMnO_4$  are dissolved per  $dm^3$  solution. Find out the %age purity of the sample. 5
- E.** 7 g of impure sodium thiosulphate have been dissolved in 250  $cm^3$  solution. Find out %age purity of the sample. 5

Chemistry	Lahore Board 2015	Inter Part-I Group – II
Time: 20 Min.	Objective Type	Marks = 17

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

- 1.1** The number of bonds in oxygen molecule is :  
 (A) One  $\sigma$  and one  $\pi$  (B) One  $\sigma$  and two  $\pi$   
 (C) Three sigma only (D) Two sigma only
- 2.** When 50% reactants in a reversible reaction are converted into a product, the value of equilibrium constant  $K_c$  is :  
 (A) 2 (B) 1  
 (C) 3 (D) 4
- 3.** Pressure remaining constant, at which temperature the volume of a gas will become twice of what it is at  $0^\circ\text{C}$  :  
 (A)  $546^\circ\text{C}$  (B)  $200^\circ\text{C}$   
 (C) 546 K (D) 273 K

- 4.** Molarity of pure water is :  
 (A) 1 (B) 18  
 (C) 55.5 (D) 6

- 5.** The wave number of the light emitted by a certain is  $2 \times 10^6 \text{ m}^{-1}$ . The wavelength of this light will be :  
 (A) 500 nm (B) 500 m  
 (C) 200 nm (D)  $5 \times 10^7 \text{ m}$

- 6.** The oxidation number of Cl in  $\text{HClO}_4$  is :  
 (A) +2 (B) +3  
 (C) +5 (D) +7

- 7.** The boiling point of water at the top of Mount Everest is:  
 (A)  $59^\circ\text{C}$  (B)  $69^\circ\text{C}$   
 (C)  $83^\circ\text{C}$  (D)  $75^\circ\text{C}$

- 8.** 2.7 g of Al will react completely with how much mass of  $\text{O}_2$  to produce  $\text{Al}_2\text{O}_3$  :  
 (A) 0.8 g of oxygen (B) 1.6 g of oxygen  
 (C) 3.2 g of oxygen (D) 2.4 g of oxygen

- 9.** For a given process, the heat changes at constant pressure ( $q_p$ ) and at constant volume ( $q_v$ ) are related to each other :  
 (A)  $q_p = q_v$  (B)  $q_p < q_v$   
 (C)  $q_p > q_v$  (D)  $q_p = \frac{q_v}{2}$

- 10** The pH of  $10^{-3} \text{ mol dm}^{-3}$  of an aqueous solution of  $\text{H}_2\text{SO}_4$  is :  
 (A) 3.0 (B) 2.7  
 (C) 2.0 (D) 1.5

- 11** Bohr model of atom is contradicted by :  
 (A) Plank's quantum theory  
 (B) Dual nature of matter  
 (C) Heisenberg's uncertainty principle  
 (D) All of these

- 12** The substance used for decolourization of undesirable colour in a crystalline substance is :  
 (A)  $\text{H}_2\text{SO}_4$  (B) Silica gel  
 (C)  $\text{NaNO}_3$  (D) Animal charcoal

- 13** Which of the following is a pseudosolid :  
 (A) NaBr (B) Glass  
 (C)  $\text{AgNO}_3$  (D) Naphthalein

- 14** Equal masses of methane and oxygen are mixed in an

empty container at  $25^\circ\text{C}$ . The fraction of total pressure exerted by oxygen is:

- (A)  $\frac{1}{3}$  (B)  $\frac{8}{9}$   
 (C)  $\frac{1}{9}$  (D)  $\frac{16}{17}$

- 15** Which of the hydrogen halides has the highest percentage of ionic character :  
 (A) HF (B) HCl  
 (C) HBr (D) HI

- 16** The enzyme used for hydrolysis of urea is :  
 (A) Invertase (B) Urease  
 (C) Lipase (D) Zymase

- 17** The mass of two moles of electrons is :  
 (A) 1.10 mg (B) 1.008 mg  
 (C) 0.184 mg (D) 1.673 mg

<b>Chemistry</b>	<b>Lahore Board 2015</b>	<b>Inter Part-I Group – II</b>
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### SECTION – I

- 2. Write short answers to any EIGHT (8) questions: 16**
- What are isotopes? Why they have same chemical but different physical properties?
  - Write down stoichiometric assumptions.
  - Define molecular formula of a compound. How is it related with its empirical formula?
  - Define sublimation and partition law.
  - Differentiate between adsorption chromatography and partition chromatography.
  - Write down the values of atmospheric pressure in four different units.
  - Write down any two applications of plasma.
  - Burning of candle is a spontaneous process. Justify it.
  - Differentiate between endothermic and exothermic reactions.
  - State the law of mass action.
  - How the values of equilibrium constant helps to predict the direction of a reversible reaction?
  - What are buffer solutions? How a basic buffer can be prepared?

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

- What is isomorphism? Give an example.
- Transition temperature is the term used for elements as well as compounds. Explain.
- The vapour pressure of diethyl ether is higher than that of water at same temperature. Give reason.
- What are dipole-dipole forces of attraction? Explain with an example.
- State the Heisenberg's Uncertainty Principle and give its mathematical form.
- Write down two defects of Rutherford's Atomic Model.
- Give electronic distribution of  $^{31}_{15}\text{P}$  and  $^{66}_{29}\text{Cu}$ .
- How neutrons were discovered by Chadwick? Give the equation of nuclear reaction involved.
- How the percentage ionic character of a covalent bond is determined by dipole moment?
- Differentiate between atomic orbital and molecular orbital.
- How the type of bonding affects solubility of compounds?
- State the geometry of  $\text{NH}_3$  molecule on the basis of VSEPR theory.

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

- One molal solution of urea in water is dilute as compared to one molar solution of urea but the number of particles of solute is same. Justify it.
- What is molarity? Calculate the molarity of a solution containing 9 grams of glucose ( $\text{C}_6\text{H}_{12}\text{O}_6$ ) in  $250\text{ cm}^3$  of solution.
- Differentiate between hydration and hydrolysis.
- Give the chemistry of electrolysis of aqueous solution of sodium chloride.
- What is electrolysis? Give example.
- Calculate oxidation number of Mn in  $\text{KMnO}_4$  and  $\text{Na}_2\text{MnO}_4$ .
- Define half life period. How is it used to determine the order of reaction?
- What is specific rate constant or velocity constant?
- Enzymes are specific in action. Justify.

### SECTION-II

**Note: Attempt any THREE questions.**

- (a) What is H-Bonding? Discuss H-Bonding in biological compounds. 4

(b)  $\text{NH}_3$  gas can be prepared by heating together two solids  $\text{NH}_4\text{Cl}$  and  $\text{Ca}(\text{OH})_2$ . If a mixture containing 100 gm of each solid is heated then calculate the number of grams of  $\text{NH}_3$  produced. (At mass of C = 12 g/mole, N = 14 gm/mole, H = 1 gm/mole, Ca = 40 gm/mole, Cl = 35.5 gm/mole, O = 16 gm/mole) 4
- (a) Explain Dalton's law of partial pressure and give its applications in breathing process. 4

(b) Write down the properties of cathode rays. 4
- (a) Explain paramagnetic behaviour of  $\text{O}_2$  on the basis of MOT and prove MOT is superior to other theories. 4

(b) What is molar heat of combustion? How it is measured by bomb calorimeter? 4
- (a) What are enzymes? Give examples in which they act as catalyst. Mention the characteristics of enzymes. 4

(b)  $\text{Ca}(\text{OH})_2$  is a sparingly soluble compound. Its solubility product is  $6.5 \times 10^{-6}$ . Calculate the solubility of  $\text{Ca}(\text{OH})_2$ . (Atomic mass : Ca = 40 ) 4
- (a) Give graphical explanation for elevation of boiling point of a solution 4

(b) Describe the electrolysis of molten  $\text{NaCl}$  and aqueous solution of  $\text{NaCl}$ . 4

### SECTION — III (Practical Part)

**Note: (i) Attempt any THREE questions.**

- Write down standard solution, chemical equation with mole ratio, indicator with end point, procedure and supposed readings with calculations for Part C, D, and E. 1,1,1,1,1
- Write down material required, diagram and procedure for Part A and B. 1,1,3

- Prepare pure sample of  $\text{NaCl}$  by common ion effect. 5
- Separate the mixture of  $\text{Pb}^{2+}$  and  $\text{Cd}^{2+}$  ions by chromatography. 5

- 6.3 g of sample of  $\begin{array}{c} \text{COOH} \\ | \\ \text{COOH} \end{array} \cdot \text{XH}_2\text{O}$  is dissolved per

$\text{dm}^3$  of solution. Determine the value of "X" (number of water molecules) volumetrically. 5

- The given solution contains partially oxidized  $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$  dissolved per  $\text{dm}^3$ . Find out the percentage purity of the sample. 5

- The given solution contains 30.0 grains a mixture of  $\text{Na}_2\text{S}_2\text{O}_3 \cdot 5\text{H}_2\text{O}$  and  $\text{Na}_2\text{S}_4\text{O}_6$  dissolved per  $\text{dm}^3$ . Find out the percentage of each component volumetrically. 5