LHR-G11-11-18

Roll No _____ (To be filled in by the candidate) **(Academic Sessions 2015 – 2017 to 2017 – 2019)**

CHEMISTRY 218-(INTER PART – I) Time Allowed : 20 Minutes

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

PAPER CODE = 6485

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 molecules has zero dipole moment : (A) NH_3 (B) $CHC\ell_3$ (C) H_2O (D) CO_2
2	NH_3 shows maximum boiling point among the hydrides of Vth group element due to : (A) Very small size of nitrogen (B) Lone pair of electrons on nitrogen (C) Enhanced electronegative character of nitrogen (D) Pyramidal structure of NH_3
3	Approximate PH of apple is : (A) 2.7 (B) 3.1 (C) 4.2 (D) 4.5
4	27 g of $A\ell$ will 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
5	The rate of reaction : (A) Increases as reaction proceeds (B) Decreases as reaction procceds (C) Remains same as reaction proceeds (D) May decrease or increase as reaction proceeds
6	When 6d orbital is complete, the entering electron goes into : (A) 7s (B) 7p (C) 7d (D) 7f
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	The number of moles of CO_2 which contain 8.0 g of oxygen : (A) 0.25 (B) 0.50 (C) 1.0 (D) 1.50
9	If an endothermic reaction is allowed to take place very rapidly in an air, the temperature of surrounding air : (A) Remains same (B) Increases (C) Decreases (D) Remains unchanged
10	An aqueous solution of ethanol in water may have vapour pressure : (A) Equal to water (B) More than that of water (C) Equal to ethanol (D) Less than that of water
11	The number of bonds in nitrogen molecule is : (A) One σ and one π (B) One σ and two π (C) Three σ only (D) Two σ and one π
12	Geometry of diamond is : (A) Tetragonal (B) Cubic (C) Rhombohedral (D) None of these
13	Oxidation number of chromium in Cr_2O_3 is : (A) +1 (B) +2 (C) +3 (D) +4
14	In the ground state of an atom, the electrons are present : (A) In the nucleus (B) In second shell (C) Nearest to the nucleus (D) Farthest from the nucleus
15	The chromatography in which stationary phase is liquid is called : (A) Thin layer chromatography (B) Partition chromatography (C) Absorption chromatography (D) Gel chromatography
16	The PH of human blood is maintained at : (A) 7.35 (B) 7.53 (C) 7.63 (D) 7.73
17	Ideal solutions obey : (A) Henry's law (B) Avogadro's law (C) Raoult's law (D) Smith's law

Roll No _____ (To be filled in by the candidate) **(Academic Sessions 2015 – 2017 to 2017 – 2019)**

CHEMISTRY 218-(INTER PART – I) Time Allowed : 2.40 hours

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

SECTION – I

LHR-G1 - 11-18

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

(i) How is the law of conservation of mass obeyed during stoichiometric calculations?

(ii) How do many chemical reactions take place in our surroundings involve the limiting reactant?

(iii) How do no individual Ne atom in the sample of the element has mass of 20.18 a.m.u.?

(iv) Define qualitative analysis and quantitative analysis of a compound.

(v) What is difference between Gooch's crucible and sintered glass crucible?

(vi) Why is SO_2 comparatively non-ideal at 273 K but behaves ideally at 327 °C?

(vii) Derive expression of molecular mass of a gas by using general gas equation.

(viii) Where do natural plasma and artificial plasma exist?

(ix) Calculate pH of 10^{-4} mole dm^{-3} solution of $HC\ell$.

(x) Why does catalyst affect the equilibrium constant?

(xi) Write the relationship of K_p and K_c.

(xii) Why can solid ice at 0 °C be melted by applying pressure without supply of heat from outside?

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

(i) Define isomorphism and polymorphism.

(ii) How are liquid crystals used to locate veins, arteries, infections and tumors?

(iii) Lower alcohols are soluble in water but hydrocarbons are insoluble. Give reason.

(iv) Why electrical conductivity of the metals decrease by increasing temperature?

(v) Why is dipole moment of CO_2 is zero but that of CO is 0.12 D?

(vi) Why do ionic compounds not exhibit the phenomenon of isomerism but covalent compounds do?

(vii) On what factors strength of bond depends upon?

(viii) Differentiate between co-ordinate covalent bond and covalent bond.

(ix) What are exothermic and endothermic reactions? Give examples.

(x) Define enthalpy of solution. Give examples.

(xi) What are zeotropic and azeotropic mixtures?

(xii) What is fractional crystallization?

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

(i) What particles are formed by the decay of free neutron, give equation?

(ii) Justify that the distance gaps between different orbits go on increasing from lower to the higher orbits.

(iii) What is Zeeman effect?

(iv) Distribute electrons in orbitals of : (a) $_{24}Cr$ (b) $_{35}Br$

(v) A salt bridge maintains the electrical neutrality in the cell, give reasons to support your answer.

LHR-G1-11-18 (2)

(vi) Calculate the oxidation numbers of the elements underlined in the following compounds :
(i) $K_2\underline{Mn}O_4$ (ii) $Ca(\underline{C\ell}O_3)_2$

(vii) SHE acts as anode when connected with Cu electrode but as cathode with Zn electrode, give reasons in support of your answer.

(viii) Define specific rate constant. Give equation to support your answer.

(ix) Define autocatalysis, give equation to support your answer.

SECTION – II

Note : Attempt any THREE questions.

(a) Serotenin (Molar mass = $176g\,mol\ell^{-1}$) is a compound that conduct nerve impulse in brain and muscle. It contains 68.2% C, 6.86% H, 15.09% N and 9.08% O. What is its molecular formula? 4

(b) Write down any four properties of molecular solids. 1,1,1,1

(a) Derive Boyle's law and Charles's law from kinetic equation. 4

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

(a) Define dipole-moment. Give its units. How is it used to determine the geometry of molecule by an example? 4

(b) State Hess's law. Explain it giving two examples. 4

(a) State Le-Chatelier's principle. How is this principle used to explain effect of change in concentration on a reaction at equilibrium state? 4

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

(a) The freezing point of pure camphor is 178.4 °C. Find the freezing point of a solution containing 2.0 g of a non-volatile compound, having molecular mass 140, in 40g of camphor. The molal freezing point constant of camphor is 37.7 °C kg mol^{-1}. 4

(b) What are enzymes? Mention the characteristics of enzyme catalysis. 4

LHR-G2-11-18

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CHEMISTRY 218-(INTER PART – I) Time Allowed : 20 Minutes

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

PAPER CODE = 6486

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	Bond energy of hydrogen (H_2) molecule is : (A) $470\,KJ\,mol^{-1}$ (B) $450\,KJ\,mol^{-1}$ (C) $436\,KJ\,mol^{-1}$ (D) $415\,KJ\,mol^{-1}$
2	Boiling point of water at Mount Everest is : (A) 69 °C (B) 78 °C (C) 98 °C (D) 45 °C
3	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^+, Ba^{2+} and NO_3^- (C) Ba^{2+} and NO_3^- only (D) Ba^{2+}, NO_3^- and $C\ell^-$
4	Number of isotopes of arsenic are : (A) 1 (B) 2 (C) 9 (D) 11
5	Photochemical reactions are usually : (A) Zero order (B) First order (C) Second order (D) Third order
6	Rutherford's model of atom failed because : (A) The atom did not have a nucleus and electrons (B) It did not account for attraction between protons and neutrons (C) It did not account for the stability of the atom (D) There is actually no space between nucleus and electrons
7	Partial pressure of oxygen in air is : (A) 110 torr (B) 112 torr (C) 114 torr (D) 159 torr
8	One mole of SO_2 contains : (A) 6.02×10^{23} atoms of oxygen (B) 18.1×10^{23} molecules of SO_2 (C) 6.02×10^{23} atoms of sulphur (D) 4 gram atoms of sulphur
9	For the given process the heat changes at constant pressure (q_p) and constant volume (q_v) are related to each other as : (A) $q_p = q_v$ (B) $q_p < q_v$ (C) $q_p > q_v$ (D) $q_p = q_v / 2$
10	The molal boiling point constant is the ratio of the elevation of boiling point to : (A) Molality (B) Molarity (C) Mole fraction of solute (D) Mole fraction of solvent
11	Which one of the following molecules has zero dipole moment : (A) H_2S (B) SO_2 (C) H_2O (D) CH_4
12	An ionic solids are characterized by : (A) Low melting point (B) Good conductivity in solid state (C) High vapour pressure (D) Solubility in polar solvents
13	Stronger is the oxidizing agent, greater is the : (A) Oxidation potential (B) Reduction potential (C) Redox potential (D) EMF of cell
14	Quantum number values of 2P orbitals are : (A) $n = 2$, $\ell = 1$ (B) $n = 1$, $\ell = 2$ (C) $n = 1$, $\ell = 0$ (D) $n = 2$, $\ell = 0$
15	Solvent extraction is an equilibrium process and is controlled by : (A) Law of mass action (B) Distribution law (C) Amount of solute used (D) Amount of solvent used
16	Rain water is : (A) Slightly acidic (B) Slightly basic (C) Neutral (D) Highly basic
17	Molarity of pure water is : (A) 45.5 (B) 55.5 (C) 65.5 (D) 75.5

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CHEMISTRY 218-(INTER PART – I) Time Allowed : 2.40 hours

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

SECTION – I

LHR-G2-11-18

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

(i) How have 4.9 g of H_2SO_4 when completely ionized in water produces equal number of positive and negative charges but the number of positively charged ions are twice than the number of negatively charged ions?

(ii) How has one mg of K_2CrO_4 thrice the number of ions than the number of formula units when ionized in water?

(iii) Why do 2g of H_2, 16g of CH_4, 44g of CO_2 occupy separately the volume of 22.414 dm^3 although the sizes and masses of molecules of three gases are very different from each other?

(iv) How does rate of filtration increase by using fluted filter paper?

(v) Name the various experimental techniques which are used for purification of substances?

(vi) Derive expression of density of gas with help of general gas equation.

(vii) Write two characteristics of plasma state.

(viii) Calculate value of the general gas constant (R) in unit of $dm^3\ atm\ K^{-1}\ mol^{-1}$.

(ix) Why do the rate of forward reaction slow down when a reversible reaction approaches the equilibrium stage?

(x) Prove by equations that what happens when Na_2CrO_4 is added to saturated solution of $PbCrO_4$?

(xi) Define Lowry Bronsted concept of acids and bases.

(xii) What is the formula to calculate the percentage ionization of weak acid?

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

(i) Why boiling point of H_2O is different at Murree hills and at Mount Everest?

(ii) Define transition temperature. Give two examples.

(iii) Why does ice float on water?

(iv) What are Debye forces?

(v) Define the term bond order with one example.

(vi) Ionization energy is an index to the metallic nature of element. Justify.

(vii) 75.4 pm is compromise distance between the bonded hydrogen atoms. Justify.

(viii) Why is no bond in chemistry 100% ionic?

(ix) Burning of candle is spontaneous process. Explain.

(x) Define enthalpy of solution and enthalpy of neutralization.

(xi) Define upper consulate temperature. Give two examples.

(xii) Give two statements of Raoult's law.

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

(i) State Pauli's exclusion principle and Hund's rule.

(ii) Calculate the number of electrons in s, p, d and f sub shells from the formula and write separately.

(iii) Write down any two postulate of Plank's quantum theory.

(iv) Why is e/m value of the cathode rays just equal to that of electron?

(Turn Over)

LHR-G2-11-18

4. (v) What is electrochemistry?

(vi) Write down the function of salt bridge.

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

(viii) The radioactive decay is always the first order reaction, give reasons.

(ix) How are enthalpy changes of reaction and energy of activation of reaction distinguished?

SECTION – II

Note : Attempt any THREE questions.

5. (a) Ethylene glycol is used as automobile antifreeze. It has 38.7% C, 9.7% hydrogen and 51.6% oxygen. Determine its empirical formula. 4

(b) How vapour pressure can be measured by manometric method? Explain with diagram. 3,1

6. (a) Explain Linde's method of liquefaction of gases. 4

(b) Write down the four properties of neutron. 4

7. (a) How does molecular orbital theory explain the paramagnetic character of O_2 molecule? Also calculate the bond order. 4

(b) State first law of thermodynamics. How does it explain that $q_p = \Delta H$? 4

8. (a) What is common ion effect? How is this effect used in salt analysis, give two examples? 4

(b) Give explanation of discharging and recharging of lead accumulator, alongwith reactions occurring at electrode. 4

9. (a) The boiling point of water is 99.725 °C. To a sample of 600g of water are added 24.0 g of a solute having molecular mass of $58g\ mol^{-1}$, to form a solution. Calculate the boiling point of the solution. 4

(b) Define order of reaction and explain 2nd and zero order reaction. 4