1118 Warning:- Please write your Roll No. in the space provided and sign.   Roll No--------------------

(Inter Part – I)   (Session 2015-17 to 2017-19)   Sig. of Student ------------------

Chemistry   (Objective)   (Group - I)   · Paper (I)

Time Allowed:- 20 minutes   **PAPER CODE 2483**   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) The order of reaction for the reaction $NO + O_3 \longrightarrow NO_2 + O_2$ is
   (A) Two   (B) Three   (C) One   (D) Zero

2) The number of isotopes of Cd is
   (A) 6   (B) 2   (C) 9   (D) 11

3) Ascorbic Acid is
   (A) Vitamin A   (B) Vitamin B   (C) Vitamin C   (D) Vitamin D

4) The comparative rates at which the solutes move in paper chromatography depends on
   (A) Size of paper   (B) R_f value of solute   (C) Temperature of experiment   (D) None of these

5) The order of rate of diffusion of gases NH_3, SO_2, Cl_2 and CO_2 is.
   (A) $NH_3 > SO_2 > Cl_2 > CO_2$ (B) $NH_3 > CO_2 > SO_2 > Cl_2$ (C) $Cl_2 > SO_2 > CO_2 > NH_3$ (D) $NH_3 > CO_2 > Cl_2 > SO_2$

6) Cholesteryl benzoate turn into milky liquid at
   (A) $140\ ^oC$ (B) $145\ ^oC$ (C) $148\ ^oC$ (D) $149\ ^oC$

7) Acetone and chloroform are soluble in each other due to
   (A) Ion dipole interaction   (B) Intermolecular hydrogen bonding   (C) Instantaneous dipole   (D) All of the above

8) The ion that is isoelectronic with CO is
   (A) $C\overline{N}$ (B) O_2^+ (C) O_2^- (D) N_2^+

9) The velocity of photon is
   (A) Independent of its wavelength   (B) Depend on its source   (C) Nature of discharge tube   (D) Equal to square of its amplitude

10) Which of the Hydrogen halides has the highest percentage of ionic character?
   (A) HCl   (B) HBr   (C) HF   (D) HI

11) The bond order of N_2 molecule is
   (A) Zero   (B) I   (C) 2   (D) 3

12) Enthalpies of all elements in their standard states are
   (A) Unity   (B) Zero   (C) Always Positive   (D) Always negative

13) The total heat content of system is called
   (A) Entropy   (B) Enthalpy   (C) Temperature   (D) Internal energy

14) The exothermic process is
   (A) Evaporation   (B) Sublimation   (C) Combustion of methane   (D) Boiling

15) Which one of the following is an ideal solution.
   (A) $C_2H_5 - OH$ and H_2O (B) C_6H_6 and CCl_4 (C) $CHCl_3$ and $(CH_3)_2CO$ (D) None of these

16) Which salt when dissolved in water form a solution with pH greater than 7
   (A) $CuSO_4$ (B) NaCl   (C) NH_4Cl (D) Na_2CO_3

17) Standard Hydrogen Electrode (SHE) is made of
   (A) Ag foil   (B) Au foil   (C) Cu foil   (D) Pt foil

1118 (Inter Part - I) Warning:- Please, do not write anything on this question paper except your Roll No.
Chemistry (Subjective) (Session 2015-17 to 2017-19) **Paper (I)**
Time Allowed: 2.40 hours **Group (I)** Maximum Marks: 68

Section ------------- I

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

(i) Write only names of any four methods employed for the separation of Isotopes.
(ii) Define gram atom giving an example. (iii) Why is theoretical yield greater than actual yield?
(iv) Differentiate between stationary and mobile phase. (v) Write uses of Chromatography.
(vi) Justify that the volume of given mass of a gas becomes theoretically zero at $-273\ °C$.
(vii) Hydrogen and Helium are ideal at room temperature, but SO_2 and Cl_2 are non ideal explain it.
(viii) Write two applications of Plasma. (ix) Define common Ion effect with one example.
(x) Define solubility product giving at least one example.
(xi) Define Law of Mass action. (xii) Define Lowry Bronsted acid and base concept.

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

(i) What are Hydrates? Give an example. (ii) Define ppm and Mole fraction.
(iii) How electron affinity changes in a group? (iv) Why sigma bond is stronger than π bond?
(v) What is meant by dipole moment and what are its units?
(vi) How a co-ordinate covalent bond differs from a covalent bond?
(vii) What is meant by internal energy of a System? (viii) Define System and Surrounding.
(ix) HCl is stronger acid than HF. Why? (x) Iodine dissolves readily in CCl_4. Why?
(xi) Define Polymorphism and Allotropy.
(xii) Why vapour pressure of CCl_4 is 87 torr while isopentane is 580 torr at $20\ °C$?

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

(i) Describe Zeeman's and Stark's effect.

(ii) Calculate the mass of an electron, $\dfrac{e}{m} = 1.7588 \times 10^{11}\ coulombs/kg$

(iii) The $\dfrac{e}{m}$ values of positive rays obtained from hydrogen gas is 1836 Time less than that of Cathode rays. Justify.

(iv) Differentiate between frequency and wave number.
(v) 'Zn' can displace Hydrogen from dilute acid solution but 'Cu' cannot. Justify.
(vi) Calculate oxidation number of 'Cr' in (a) $CrCl_3$, (b) $K_2Cr_2O_7$
(vii) What is difference between Primary and Secondary Cell.
(viii) What is Zero order reaction? Give one example.
(ix) What is specific rate Constant or Velocity Constant.

Section ----------- II

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

5. (a) Ethylene glycol is used as automobile antifreez. It has 38.7 % carbon, 9.7 % hydrogen and 51.6 % oxygen. Determine its empirical formula.
   (b) Explain the term molecular solid. Give three properties of molecular solids.
6. (a) Give explaination of applications of Dalton's Law of Partial Pressure of gases.
   (b) Derive an expression for radius of nth orbit of Hydrogen atom with the help of Bohr's atomic model.
7. (a) Write down main points of Valence Shell electron pair repulsion (VSEPR) theory.
   (b) Describe Bomb Calorimeter, for calculation of enthalpy of a substance.
8. (a) State Law of mass action. Derive an equilibrium constant expression for a general reaction.
   (b) Write a note on Fuel cells.
9. (a) What is Catalyst? Write its three characteristics?
   (b) The freezing point of pure Camphor is $178.4\ °C$. Find the freezing point of a solution containing 2.0 g of non-volati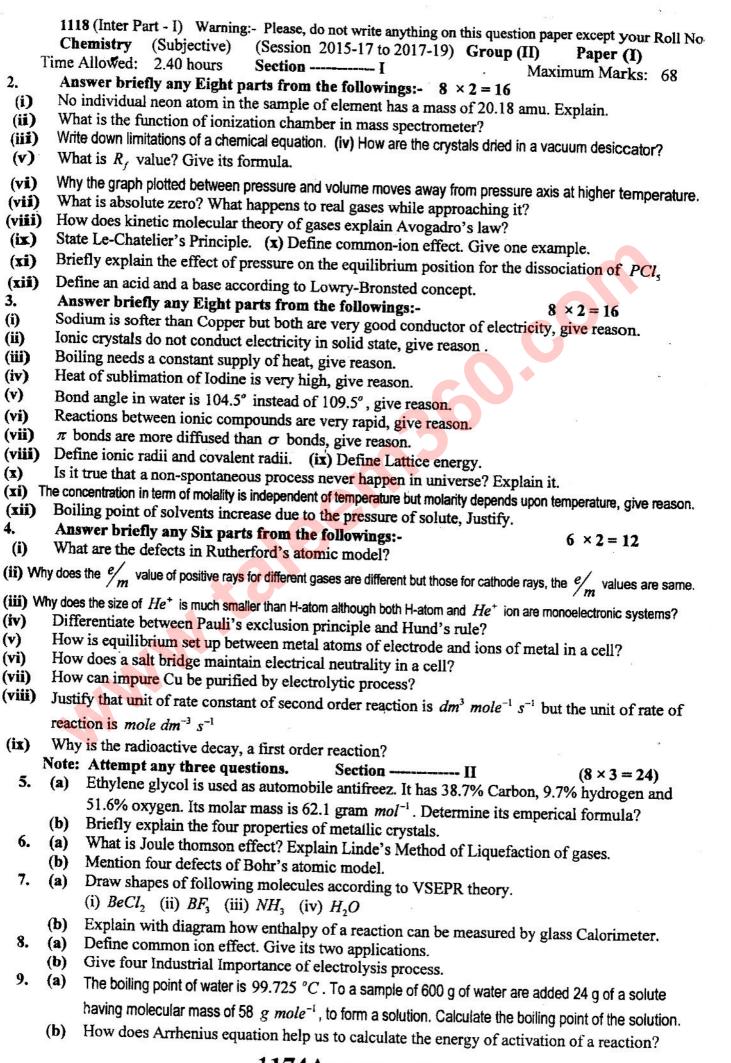le compound, having molecular mass 140, in 40 g of Camphor. The molal freezing point constant of Camphor is $37.7\ °C\ kg\,mol^{-1}$

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(Inter Part – I)   (Session 2015-17 to 2017-19)   Sig. of Student ----------------
Chemistry (Objective)   (Group - II)   Paper (I)
Time Allowed:- 20 minutes   **PAPER CODE 2482**   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) 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

2) 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

3) Solvent extraction is an equilibrium process and is controlled by
(A) Law of mass action   (B) Amount of solvent used   (C) Distribution Law   (D) The amount of solute

4) 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) $\frac{16}{17}$

5) 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

6) Acetone and chloroform are soluble in each other due to
(A) Intermolecular hydrogen bonding   (B) Ion-dipole interaction   (C) Instantaneous dipole   (D) All of the above

7) Molecules of CO_2 in dry ice form the
(A) Ionic crystals   (B) Covalent crystals   (C) Molecular crystals   (D) Any type crystal

8) The wave ------- number of the light emitted by a certain source is 2×10^6 m^{-1}. The wave-length of this light will be
(A) 500 nm   (B) 500 m   (C) 200 nm   (D) 5×10^7 m

9) When 6d orbital is complete, the entering electron goes into
(A) 7f   (B) 7s   (C) 7p   (D) 7d

10) Which of the following molecules has zero dipole-moment?
(A) NH_3 (B) $CHCl_3$ (C) H_2O (D) BF_3

11) Which of the hydrogen halides has the highest percentage of ionic character?
(A) HCl   (B) HBr   (C) HF   (D) HI

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

13) 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

14) The solubility product of AgCl is 2.0×10^{-10} $mol^2\ dm^{-6}$. The maximum conc of Ag^+ ions in the 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} $mol\ dm^{-3}$

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

16) 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

17) The unit of the rate constant is the same as that of the rate of reaction is
(A) 1st order reaction   (B) 2nd order reaction   (C) Zero order reaction   (D) 3rd order reaction

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1118 (Inter Part - I) Warning:- Please, do not write anything on this question paper except your Roll No.
Chemistry (Subjective) (Session 2015-17 to 2017-19) **Group (II)** **Paper (I)**
Time Allowed: 2.40 hours **Section ------------ I**
Maximum Marks: 68

2. **Answer briefly any Eight parts from the followings:-** $8 \times 2 = 16$
(i) No individual neon atom in the sample of element has a mass of 20.18 amu. Explain.
(ii) What is the function of ionization chamber in mass spectrometer?
(iii) Write down limitations of a chemical equation. (iv) How are the crystals dried in a vacuum desiccator?
(v) What is R_f value? Give its formula.
(vi) Why the graph plotted between pressure and volume moves away from pressure axis at higher temperature.
(vii) What is absolute zero? What happens to real gases while approaching it?
(viii) How does kinetic molecular theory of gases explain Avogadro's law?
(ix) State Le-Chatelier's Principle. (x) Define common-ion effect. Give one example.
(xi) Briefly explain the effect of pressure on the equilibrium position for the dissociation of PCl_5
(xii) Define an acid and a base according to Lowry-Bronsted concept.

3. **Answer briefly any Eight parts from the followings:-** $8 \times 2 = 16$
(i) Sodium is softer than Copper but both are very good conductor of electricity, give reason.
(ii) Ionic crystals do not conduct electricity in solid state, give reason.
(iii) Boiling needs a constant supply of heat, give reason.
(iv) Heat of sublimation of Iodine is very high, give reason.
(v) Bond angle in water is 104.5° instead of 109.5°, give reason.
(vi) Reactions between ionic compounds are very rapid, give reason.
(vii) π bonds are more diffused than σ bonds, give reason.
(viii) Define ionic radii and covalent radii. (ix) Define Lattice energy.
(x) Is it true that a non-spontaneous process never happen in universe? Explain it.
(xi) The concentration in term of molality is independent of temperature but molarity depends upon temperature, give reason.
(xii) Boiling point of solvents increase due to the pressure of solute, Justify.

4. **Answer briefly any Six parts from the followings:-** $6 \times 2 = 12$
(i) What are the defects in Rutherford's atomic model?
(ii) Why does the e/m value of positive rays for different gases are different but those for cathode rays, the e/m values are same.
(iii) Why does the size of He^+ is much smaller than H-atom although both H-atom and He^+ ion are monoelectronic systems?
(iv) Differentiate between Pauli's exclusion principle and Hund's rule?
(v) How is equilibrium set up between metal atoms of electrode and ions of metal in a cell?
(vi) How does a salt bridge maintain electrical neutrality in a cell?
(vii) How can impure Cu be purified by electrolytic process?
(viii) Justify that unit of rate constant of second order reaction is $dm^3 \, mole^{-1} \, s^{-1}$ but the unit of rate of reaction is $mole \, dm^{-3} \, s^{-1}$
(ix) Why is the radioactive decay, a first order reaction?

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

5. (a) Ethylene glycol is used as automobile antifreez. It has 38.7% Carbon, 9.7% hydrogen and 51.6% oxygen. Its molar mass is 62.1 gram mol^{-1}. Determine its emperical formula?
(b) Briefly explain the four properties of metallic crystals.

6. (a) What is Joule thomson effect? Explain Linde's Method of Liquefaction of gases.
(b) Mention four defects of Bohr's atomic model.

7. (a) Draw shapes of following molecules according to VSEPR theory.
(i) $BeCl_2$ (ii) BF_3 (iii) NH_3 (iv) H_2O
(b) Explain with diagram how enthalpy of a reaction can be measured by glass Calorimeter.

8. (a) Define common ion effect. Give its two applications.
(b) Give four Industrial Importance of electrolysis process.

9. (a) The boiling point of water is 99.725 °C. To a sample of 600 g of water are added 24 g of a solute having molecular mass of 58 $g \, mole^{-1}$, to form a solution. Calculate the boiling point of the solution.
(b) How does Arrhenius equation help us to calculate the energy of activation of a reaction?

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