1119 Warning:- Please write your Roll No. in the space provided and sign. Roll No ___SG___

(Inter Part – I)   (Session 2015-17 to 2018-20)   Sig. of Student --------------

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

Time Allowed:- 20 minutes   **PAPER CODE 2487**   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) Molarity of pure water is
   (A) 1   (B) 18   (C) 55.5   (D) 6

2) Which of the following statement is correct about galvanic cell.
   (A) Anode is negatively charged   (B) Reduction occurs at anode   (C) Cathode is positively charged   (D) Reduction occurs at cathode

3) With increase of $10\ ^{\circ}C$ temperature the rate of reaction doubles. This increase in rate of reaction is due to
   (A) Decrease in activation energy of reaction   (B) Decrease in the number of collisions between reactant molecules   (C) Increase in activation energy of reactants   (D) Increase in number of effective collisions

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

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) Solvent extraction method is a particularly useful technique for separation when the product to be separated is
   (A) Non-volatile or thermally unstable   (B) Volatile or thermally stable   (C) Non-volatile or thermally stable   (D) Volatile or thermally unstable

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

8) Pressure remaining constant, at which temperature, the volume of a gas will become twice of what is at $0\ ^{\circ}C$
   (A) $546\ ^{\circ}C$ (B) $200\ ^{\circ}C$ (C) 546 K   (D) 273 K

9) 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

10) The molecules of CO_2 in dry ice form the
   (A) Ionic crystals   (B) Covalent crystals   (C) Molecular crystals   (D) Any type of crystals

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

12) Orbitals having same energy are called,
   (A) Hybrid orbitals   (B) Valence orbitals   (C) Degenerate orbitals   (D) d-orbitals

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

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

15) The net heat change in a chemical reaction is same, whether it is brought about in two or more different ways in one or several steps. It is known as
   (A) Henry's Law   (B) Joule's principle   (C) Hess's Law   (D) Law of Conservation of energy

16) 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

17) An azeotropic mixture of two liquids boils at a lower temperature than either of them when
   (A) It is saturated   (B) It shows positive deviation from Rault's Law   (C) It shows negative deviation from Rault's Law   (D) It is metastable

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Chemistry (Subjective) (Session 2015-17 to 2018-20) **Group (I)**   **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)   Differentiate between atom and molecule

(ii)   Write function of $Mg(ClO_4)_2$ and 50% KOH in combustion analysis.

(iii)   Differentiate between empirical and molecular formula.

(iv)   What is R_f value. Why does it has no units.   (v) How is a saturated solution prepared.

(vi)   Define absolute zero temperature.   (vii) Water vapours do not behave ideally at 273K. Justify.

(viii)   Define one atmospheric pressure. Give its two units.   (ix) Prove that $d = \dfrac{PM}{RT}$

(x)   Define mole fraction and Parts per million.

(xi)   Define critical solution temperature and conjugate solutions.

(xii)   Write names of colligative properties of dilute solutions.

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

(i)   Why ice occupies 9% more volume than liquid water?

(ii)   How Soaps and detergents do their cleansing action?

(iii)   How vacuum distillation can be used to avoid decomposition of a sensitive liquid?

(iv)   Define Molar Heat of vapourization.   (v) Why e/m value of cathode rays is just equal to that of electron?

(vi)   Give electronic configuration of $_{24}Cr$ and $_{20}Ca$ (vii) Write two properties of positive rays.

(viii)   Why it is necessary to decrease the pressure in the discharge tube to get the cathode rays?

(ix)   State Lowery-Bronsted acid and base theory.   (x) Define the term activation of catalyst.

(xi)   How does buffer act?   (xii) Differentiate between Homogenous and Heterogenous catalysis.

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

(i)   Define coordinate covalent bond. Give one example.

(ii)   How does molecular orbital theory explain paramagnetic properties of oxygen?

(iii)   Ionic compounds are mostly soluble in water but insoluble in non-polar solvents. Give reason.

(iv)   The difference in electronegativity of bonded atoms is an index of polar nature of the covalent bond. Comment on the statement.

(v)   Define spontaneous process giving one example.

(vi)   Justify that heat of formation of compound is the sum of all the other enthalpies.

(vii)   How does electrochemical series explain the displacement of one metal by another from its solution?

(viii)   Write down reactions involved in the working of NICAD cell.

(ix)   Write down the construction of standard hydrogen electrode (SHE)

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

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

5.   (a)   Define yield of chemical reaction. Also define two types of yields. How these two yields are related by a mathematical expression?

     (b)   Describe covalent solids with reference to

       (i) hardness, (ii) conductivity, (iii) solubility in water, and (iv) melting points.

6.   (a)   A sample of nitrogen gas is enclosed in a vessel of volume $380 cm^3$ at $120\,°C$ and pressure of $101325\ Nm^{-2}$. This Gas is transferred to $10\ dm^3$ flask and cooled to $27\,°C$. Calculate the pressure in Nm^{-2} exerted by gas at $27\ C^o$.

     (b)   Define spectrum. Give difference between Continuous and Line spectrum.

7.   (a)   Write main postulates of VSEPR-theory.

     (b)   How heat of combustion is measured by Bomb calorimeter?

8.   (a)   Calculate the pH of a buffer solution in which 0.11 molar CH_3COONa and 0.09 molar acetic acid solutions are present. K_a for CH_3COOH is 1.85×10^{-5}

     (b)   Describe Half life method for finding order of reaction.

9.   (a)   Explain the effect of temperature on Phenol-Water System.

     (b)   Describe the electrolysis of molten sodium chloride

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Warning.- Please write your Roll No. in the space provided and sign.   Roll No.----------------
(Inter Part – I)   (Session 2015-17 to 2018-20)   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) 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 SO_2

2) The mass of one mole of electrons are
   (A) 1.008 mg   (B) 0.55 mg   (C) 0.184 mg   (D) 1.673 mg

3) 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

4) Pressure remaining constant, at which temperature the volume of a gas will becomes twice of what it is at $0\ ^{\circ}C$.
   (A) 546 $^{\circ}C$ (B) 200 $^{\circ}C$ (C) 546 K   (D) 273 K

5) 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) $55.6 \times 6.02 \times 10^{23}$

6) 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 in bond lengths   (D) Change of bond angles

7) Diamond is a bad conductor because
   (A) It has a tight structure   (B) It has a high density   (C) There are no free electron present in the crystal of diamond to conduct electricity   (D) It is transparent to light

8) Orbitals having same energy are called;
   (A) Hybrid orbitals   (B) Valence orbitals   (C) Degenerate orbitals   (D) d-orbitals

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

10) In the following species which have unpaired electrons in antibonding molecular orbitals.
   (A) O_2^{2+} (B) N_2^{2-} (C) B_2 (D) F_2

11) In the following molecules which have zero dipole moment.
   (A) NH_3 (B) $CHCl_3$ (C) H_2O (D) BF_3

12) For the reaction $NaOH + HCl \longrightarrow NaCl + H_2O$ the change in enthalpy is called;
   (A) Heat of reaction   (B) Heat of formation   (C) Heat of Neutralization   (D) Heat of combustion

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

14) 18 g of 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

15) 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

16) 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 take place

17) 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) Zero order reaction   (D) Third order reaction

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

(i) Define macromolecules give examples. (ii) Differentiate between cation and Anion.

(iii) Atomic mass of elements are in fraction give reason.

(iv) Write four properties of best solvent. (v) Why is there need to crystallize crude products.

(vi) State charles law, write its mathematical form. (vii) Write any four properties of liquid.

(viii) Derive the value of "R" in "SI" units. (ix) Define Avogadros Law give examples.

(x) Define Molality. Also write its formula.

(xi) Write two difference between Ideal and Non Ideal solutions.

(xii) Aqeous solution of CH_3COONa is basic and aqeous solution of $CuSO_4$ is acidic give reason. $8 \times 2 = 16$

3. **Answer briefly any Eight parts from the followings:-**

(i) Write down any two uses of liquid crystals in daily life.

(ii) One feels sense of cooling under the fan after bath. Comment on it.

(iii) Ionic crystals donot conduct electricity in the solid state. Justify it.

(iv) Why sodium chloride and caesium chloride have different structures.

(v) State Moseley Law, Also write its two importance in periodic table.

(vi) Write down two defects of Rutherford's Atomic model.

(vii) Describe any two properties of canal rays. (ix) State Le-chatelier's principle.

(viii) How $^{14}_{7}N$ is converted into $^{11}_{5}B$. Give equation.

(x) Define pH and pOH. (xi) Describe Heterogeneous catalysis with an example.

(xii) Write note on (a) Auto catalyst (b) Promotor $6 \times 2 = 12$

4. **Answer briefly any Six parts from the followings:-**

(i) Define ionization energy. Give an example.

(ii) Why does the lone pair occupy more space than bond pair.

(iii) MOT is superior to VBT. Explain. (iv) Why dipolemoment of CO_2 is zero but H_2O 1.85 Debye.

(v) Define heat of neutralisation. Give an example. (vi) State Hess's Law.

(vii) Differentiate between electrolytic and Galvanic cell.

(viii) How is the impure copper purified. (ix) Explain the electrolysis of fused $PbCl_2$

Section ------------ II $(8 \times 3 = 24)$

Note: **Attempt any three questions.**

5. (a) Define empiral formula. Write down various steps to calculate the empirical formula of a compound.

(b) Differentiate between isomorphism and polymorphism with suitable examples.

6. (a) One mole of methane gas is maintained at 300 K. Its volume is 250 cm^3. Calculate the pressure exerted by the gas when gas is behaving as ideal.

(b) Describe J.J Thomson experiment to determine the e/m value of an electron.

7. (a) Explain para magnetic behaviour of O_2 on the basis of Molecular orbital theory.

(b) Describe bomb Calorimeter method for calculation of enthalpy of a substance.

8. (a) The solubility of PbF_2 at 25 °C is 0.64 $g\,dm^{-3}$. Calculate solubility product constant (K_{SP}) of PbF_2 Molar mass of $PbF_2 = 245.2\ g\,mol^{-1}$

(b) Define order of a chemical reaction. How does half-life method can be used for its measurement.

9. (a) Give graphical explanation for depression in freezing point.

(b) Define electrochemical series of elements. Give its two applications.

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