HSSC-(P-I)-A/2023

Paper Code | 6 | 4 | 8 | 7

Roll No _____ to be filled in by the candidate

(For All Sessions)

(Group-I)

Time: 20 Minutes Marks : 17

Chemistry (Objective)

Rwp-11-1-23

Note: Write Answers to the Questions on the objective answer sheet provided. Four possible answers A, B, C and D to each question are given. Which answer you consider correct, fill the corresponding circle A, B, C or D given in front of each question with Marker or Pen ink on the answer sheet provided.

1.1 The bond order of N_2 is (A) 2 (B) 1 (C) 0 (D) 3

2. In endothermic reaction, heat content of:
   (A) Product is more than that of reactant (B) Reactant is more than that of product
   (C) Surrounding increases (D) Reactants and products are equal

3. Which of the following is not a state function:
   (A) Enthalpy (B) Temperature (C) Work (D) Internal energy

4. Dilution increases the degree of dissociation, is the statement of which of the following law or principle.
   (A) Le-Chatelier principle (B) Law of mass action (C) Ostwald dilution law (D) Hess's law

5. PH of the soft drink is: (A) 2.0 (B) 3.0 (C) 5.8 (D) 4.6

6. Molarity of pure water is: (A) 1 (B) 18 (C) 55.6 (D) 6

7. Stronger the oxidizing agent, greater is the :
   (A) Oxidation potential (B) Reduction potential (C) Redox potential (D) E.m.f of the cell

8. Which of the following gas is bubbled through standard hydrogen electrode at one atmospheric pressure?
   (A) HCl gas (B) Pure H_2 gas (C) Chlorine gas (D) O_2 gas

9. The unit of rate constant is same as that of rate of reaction in:
   (A) 1st Order Reaction (B) 2nd Order Reaction (C) Zero Order Reaction (D) 3rd Order Reaction

10. The mass of 10 moles of electrons is:
    (A) 10.08 mg (B) 5.5 mg (C) 1.84 mg (D) 16.73 mg

11. The number of moles of CO_2 which contains 16 g of oxygen:
    (A) 1.0 moles (B) 0.50 moles (C) 2.0 moles (D) 3.0 moles

12. A complete quantitative determination generally consists of how many steps?
    (A) 4 steps (B) 5 steps (C) 2 steps (D) 6 steps

13. Pressure remaining constant, at which temperature the volume of a gas will become twice of what it is at 0^0C
    (A) 546^0C (B) 200^0C (C) $546\ k$ (D) 273 k

14. The scientist who identified plasma is:
    (A) William Crookes (B) Vander Waal (C) Rutherford (D) Boyle

15. When water freezes at 0^0C, 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

16. Total number of Bravias lattices are: (A) 7 (B) 10 (C) 12 (D) 14

17. The nature of positive rays depends upon:
    (A) The nature of electrode (B) The nature of residual gas
    (C) The nature of discharge tube (D) The length of discharge tube

Roll No _____ to be filled in by the candidate

HSSC-(P-I)-A/2023

Marks : 68

Chemistry (Subjective)

(GROUP-I) (For All Sessions)

Time: 2:40 hours

SECTION-I Rwp-11-1-23

2. **Write short answers of any eight parts from the following:** (8x2=16)

i. Why Isotopes of same element show similar chemical properties?

ii. Prove N_2 and CO have the same number of electrons, protons and neutron.

iii. Define molecular ion with examples.

iv. What is $\Delta H°f$? Give one example.

v. Why gases behave non ideally at high pressure and low temperature?

vi. What are the two faulty points of KMT?

vii. What is plasma? How it is formed?

viii. What is Zeeman effect?

ix. Why positive rays are also called as canal rays?

x. The e/m value of positive rays for different gases is different? Justify it.

xii. Define Lattice Energy? Give example.

xii. What is state function? Give any two examples.

3. **Write short answers of any eight parts from the following:** (8x2=16)

i. Define ppm and give its mathematical formula?

ii. State Raoult's law.

iii. Elevation of boiling point is a colligative property. Justify it.

iv. Give two characteristics of enzyme catalyst.

v. Define half life period. Give one example.

vi. Define homogeneous catalysis with an example.

vii. Evaporation causes cooling. Explain with reason.

viii. Define Allotropy with an example.

ix. What do you mean by lattice energy? Give an example.

x. Write down two uses of chromatography.

xi. What is fluted filter paper?

xii. Write any two methods for drying of crystals.

4. **Write short answers of any six parts from the following:** (6x2=12)

i. Justify that π bond are more diffused than sigma bond.

ii. Write the Lewis structures for the following compound: i) N_2O_5 ii) H_3PO_4

iii. What is bond order? Calculate bond order for H_2 molecule.

iv. Why change of temperature disturbs both the equilibrium position and the equilibrium constant of a reaction.

v. What is common ion effect? Give one example.

vi. What is PH and POH?

vii. SHE acts as anode when connected with Cu electrode but as cathode with Zn electrode. Give reason.

viii. Calculate the oxidation numbers of the elements underlined. i) $Na_3\underline{P}O_4$ ii) $H\underline{N}O_3$

ix. Define electrode potential.

SECTION-II

Note **Attempt any three questions. Each question carries equal marks:** (8x3=24)

5. (a) Define stoichiometry. Give its assumption and mention laws obeyed during stoichiometric calculation. 4

(b) Calculate the number of atoms in $20cm^3$ of CH_4 at 0°C and pressure of 700 mm of Hg. 4

6. (a) Define boiling point. What is the effect of external pressure on boiling point? Give two examples. 4

(b) Explain the Born-Haber cycle to calculate the lattice energy of sodium chloride. 4

7. (a) How neutron was discovered? Explain with the help of an experiment also write four properties of neutron. 4

(b) The equilibrium constant for the reaction between acetic acid and ethyl alcohol is 4.0. A mixture of 3 moles of acetic acid and one mole C_2H_5OH is allowed to come to equilibrium. Calculate the amount of ethyl acetate at equilibrium state in no of moles and grams. Also calculate mass of reactants left behind. 4

8. (a) Define ionization energy, name the factors influencing the ionization energies of elements. What is a trend of ionization energy in the periodic table. 4

(b) What is meant by Lead Accumulator explain it in detail, Give chemical equations of discharging and recharging. 1x4=4

9. (a) Differentiate between ideal and Non ideal solutions. 2+2=4

(b) Discusss how surface area and nature of reactants affect rate of a chemical reaction.

Roll No _____ to be filled in by the candidate

HSSC-(P-I)-A/2023

Paper Code	6	4	8	6

(For All Sessions)

Rwp-11-2-23

Chemistry (Objective)

Group-I

Time: 20 Minutes Marks : 17

Note: Write Answers to the Questions on the objective answer sheet provided. Four possible answers A, B, C and D to each question are given. Which answer you consider correct, fill the corresponding circle A, B, C or D given in front of each question with Marker or Pen ink on the answer sheet provided.

1.1 The PH of tomato is: (A) 12 (B) 4.2 (C) 7.2 (D) 9.2

2. For which system does the equilibrium constant Kc has unit of $(Concentration)^{-1}$?

(A) $N_2 + 3H_2 \rightleftharpoons 2NH_3$ (B) $H_2 + I_2 \rightleftharpoons 2HI$ (C) $2NO_2 \rightleftharpoons N_2O_4$ (D) $2HF \rightleftharpoons H_2 + F_2$

3. 18 g glucose is dissolved in 90g of water. The relative lowering of vapor pressure is equal to:

(A) $^1/_5$ (B) 5.1 (C) $^1/_{51}$ (D) 6

4. The oxidation number of chromium in $K_2Cr_2O_7$ is:

(A) 4 (B) 2 (C) 6 (D) 3

5. Stronger is the oxadizing agent greater is the:

(A) Oxidation potential (B) Reduction potential (C) Redox potential (D) E.M.F of cell

6. The unit of 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

7. 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) $5.8\ g\ of\ N_2O_5$

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 grams atoms of SO_2

9. The rate of filtration can be increased by using:

(A) Desicator (B) Suction flask (C) Cold finger (D) Chromatographic tank

10. Which of the following will have the same no of molecules at STP?

(A) $11.2\ dm^3$ and $32\ g\ of\ O_2$ (B) $280\ cm^3$ of CO_2 and $280 cm^3\ of\ N_2O$ (C) $44\ g\ of\ CO_2$ and $11.2\ dm^3$ of oxygen (D) $280\ g\ of\ N_2$ and $5.6\ dm^3$ of oxygen

11. Normal human body temperature is:

(A) 37^0C (B) 98.6^0C (C) 37^0F (D) 273 K

12. Which of the following is a pseudo solid: (A) CaF_2 (B) Glass (C) NaCl (D) NaOH

13. Hydrogen bonding is maximum in: (A) HI (B) HBr (C) HCl (D) HF

14. The velocity of photon is:

(A) Independent of its wave length (B) Depends on its wave length (C) Equal to square of its amplitude (D) Depends on its source.

15. Which of the following molecule have zero dipole moment:

(A) NH_3 (B) $CHCl_3$ (C) H_2O (D) BF_3

16. Calories is equal to: (A) 0.4184 J (B) 41.84 J (C) 4.184 J (D) 418.4 J

17. Spontaneous reactions are:

(A) Reversible (B) Irreversible (C) No irreversible (D) None of these

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Chemistry (Subjective) | GROUP-I | Time: 2:40 hours

Rwp-11-2-23

SECTION-I

2. **Write short answers of any eight parts from the following:** (8x2=16)

i. Enlist different methods for separation of Isotopes.
ii. What is meant by internal energy?
iii. Give the contribution of J.Berzelius towards chemistry.
iv. Distinguish between diffusion and effusion of gases.
v. State Chale's law also write its mathematical formula.
vi. Enlist two characteristics of plasma.
vii. State Heisenberg's uncertainty principle and give its formula.
viii. Define system with an example.
ix. Define Pauli's exclusion principle. Give an example.
x. What is thermo chemistry?
xi. Calculate the mass of electrons from the value of charge and e/m.
xii. How molecular ions one generated? Name methods of generation.

3. **Write short answers of any eight parts from the following:** (8x2=16)

i. Define solution give an example.
ii. What is ppm? Give its mathematical formula.
iii. Define colligative properties of solutions.
iv. What is meant by auto catalysis?
v. What are enzymes? Give an example.
vi. Radioactive decay is always a first order reaction. Why?
vii. State partition law.
viii. Define partition chromatography.
ix. How crystals can be decolorized?
x. HF is weaker acid than HCl. Why?
xi. Define polymorphism. Give an example.
xii. Ionic crystals are highly brittle. Why?

4. **Write short answers of any six parts from the following:** (6x2=12)

i. Write two points of Valence Shell Electron Pair Repulsion theory (VSEPR).
ii. Why the lone pairs of electrons on an atom occupy more space?
iii. Define bond order. Give one example.
iv. Give statement of Lechatlier's principle.
v. Define pH with mathematical expression.
vi. What is common ion effect? Give two examples.
vii. Impare "Cu" can be purified by electrolytic process.
viii. A porous plate on a salt bridge is not required in load storage cell.
ix. SHE acts as anode when connected with the "Cu" electrode but as cathode with "Zn" electode.

SECTION-II

Note **Attempt any three questions. Each question carries equal marks:** (8x3=24)

5. (a) Write down the steps involved for the determination of emphirical formula. 4

(b) 250 cm^3 of sample of hydrogen effuses four times as rapidly as an unknown gas. Calculate molar mass of unknown gas. 4

6. (a) Explain following types of Inter Molecular forces at least with one example each:

(ii) Dipole-Dipole forces (ii) Dipole –Induced Dipole forces 2+2

(b) Explain Born-Haber cycle in detail: 4

7. (a) Give four defects of Bohr's atomic model 1x4=4

(b) The solubility of P_bF_2 at 25^0C is 0.64 gdm^{-3}. Calculate Ksp of P_bF_2 $(At\ mass\ of\ P_b = 207,\ F = 19)$ 4

8. (a) Explain atomic orbital hybridization with reference to the structure of C_2H_2 and C_2H_4 2+2

(b) Write comprehensive note on lead accumulator with its discharging and recharging process. 2+2

9. (a) Give three statements of Roult's law with equations. 4

(b) How order of reaction is measured using half-life method and method of large excess? 4