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Inter - (Part-I)-A-2022

Roll No._____ to be filled in by the candidate

(For All Sessions)

Group - I

Paper Code	6	4	8	3

Chemistry (Objective Type)

RwP-G(I-22

Time:20 Minutes **Marks:17**

NOTE: Write answers to the questions on objective answer sheet provided. Four possible answers A, B, C & 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. Amorphous solids:
(A) Have shape melting point
(B) Under go clean cleavage when cut with knife
(C) Have perfect arrangement of atoms
(D) Have small region of orderly arrangement of atom

2. The value of charge on electron is:
(A) 2.602×10^{-19} Coulombs (B) 1.602×10^{19} Coulombs (C) 1.6023×10^{-19} Coulombs (D) 1.602×10^{-19} Kg

3. Quantum number value for 2S orbitals are:
(A) $n=2,\ l=1$ (B) $n=1,\ l=2$ (C) $n=1,\ l=o$ (D) $n=2,\ l=o$

4. Which of the following species has unpaired electrons in the antibonding bonding molecular orbitals?
(A) O_2^{-2} (B) N_2^{2-} (C) B_2 (D) F_2

5. Geometry of H_2O on the basis of VSEPR theory.
(A) Linear (B) Trigonal planer (C) Tetrahedral (D) Bent

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

7. For which system, does the equilibrium constant Ice has no units.
(A) $N_2+3H_2 \rightleftharpoons 2NH_3$ (B) $H_2+I_2 \rightleftharpoons 2HI$ (C) $2No_2 \rightleftharpoons N_2O_4$ (D) None of these

8. Colligative properties are the properties of:
(A) Dil solution which behave as nearly ideal solutions
(B) Concentrated solution which behave as nearly non-ideal solution
(C) Both (A) and (B)
(D) None of there

9. If the salt bridge is not used between half cells, then the voltage.
(A) Decrease rapidly (B) Decrease slowly (C) Does not change (D) Drops to Zero

10. If the equation at reaction $2A+B \rightarrow Product$
$rate = K[A]^2[B]$
A is present in large excess, then order of reaction is.
(A) 1 (B) 2 (C) 3 (D) 4

11. One mole of So_2 contain:
(A) 6.02×10^{23} atoms of oxygen
(B) 1.81×10^{23} molecule of So_2
(C) 6.02×10^{23} atoms of Sulphur
(D) 4 gram atoms of So_2

12. A limiting reactant is one which is:
(A) Taken is small amount in gram as compared to other reactant
(B) Taken in lesser amount in volume as compared to other reactant.
(C) Give the maximum amount of product
(D) Give minimum amount of product

13. A filtration process could be very time consuming if it were not aided by suction which is developed:
(A) If the paper covers the funnel up to the circumference
(B) If the paper has got small sized pores in it
(C) If the stem at the funnel in large so that it dips into the filtrate
(D) If the paper fits tightly

14. Solvent extraction is an equilibrium process and is controlled by.
(A) Law of Mass action
(B) Amount of solvent used
(C) Partition law
(D) Amount of solute

15. Pressure remain constant, at which temperature the volume of gas will become twice of what it is at 0°C.
(A) 546°C (B) 200°C (C) 546 K (D) 273 K

16. 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) $NH_3 > Co_2 > Cl_2 > So_2$

17. In order to raise the building point at H_2O up to 110°C, the external pressure should be.
(A) Between 760 torr and 1200 torr
(B) Between 200 torr and 760 torr
(C) 576 torr
(D) At any pressure

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(For All Sessions)

Group - I

Chemistry (Essay Type)

RwP Sft-22

Time: 2:40 Hours

Section - I

Marks:68

2- Write short answers of any eight parts from the following. 2 x 8 = 16

i. How molecular ions are formed? Give example.

ii. Define Mole and Avogadro's Number.

iii. What is percentage yield? Write its formula.

iv. Write down two phases of chromatography.

v. Define solvent extraction.

vi. Why fluted filter paper in more useful than ordinary filter paper for filtration?

vii. Convert 30° centigrade into Fahrenheit scale.

viii. What is Joule Thomson effect?

ix. Write down any two applications of plasma.

x. Calculate PH of 10^{-4} mole dm^{-3} of Hcl solution.

xi. What are the optimum conditions of temperature and pressure to get maximum yield of ammonia? $N_2 + 3H_2 \rightleftharpoons 2NH_3 + 92.46Kj$

xii. State Le-chatelier's principle.

3- Write short answers of any eight parts from the following. 2 x 8 = 16

i. What do you mean by Habit of a crystal? Give an example.

ii. Define molar heat of vaporization and Molar heat of sublimation.

iii. Boiling points of halogens increase down the group. Give the reason.

iv. Ide floats on water. Give the reason.

v. What do you mean by Line Spectrum?

vi. What is $n+l$ rule? Give an example.

vii. Why is the e/m value for positive rays obtained from hydrogen gas 1836 times less than that of cathode rays?

viii. State Heisen berg's Uncertainty Principle. Also write its mathematical form.

ix. What are conjugate solutions? Give an example.

x. What are hydrates? How are they formed?

xi. What is auto-catalysis? Give an example.

xii. A catalyst is specific in its action. Give one example to prove it.

4- Write short answers of any six parts from the following. 2 x 6 = 12

i. Bond distance is the compromised distance between two atoms.

ii. π bonds are more diffused than sigma bonds. Justify it.

iii. What are bonding and antibonding molecular orbitals? Give examples.

iv. Define non polar covalent bond. Give examples.

v. Define a spontaneous reaction.

vi. Why the temperature of the system changes during exothermic and endothermic reactions.

vii. Burning of Candle is a spontaneous process. Justify it.

viii. A salt bridge maintains the electrical neutrality in the cell. Give reasons.

ix. Write anodic reaction in alkaline battery.

Section - II

8 x 3 = 24

NOTE: Answer any three questions from the following.

5.(a) What is the difference between actual yield and theoretical yield? Why actual yield is less than the theoretical yield.

(b) What is spectrum? Explain Atomic Emission and Atomic absorption spectrum. 04+04

6.(a) 250 Cm^3 of hydrogen is cooled from 127°C to -27° by maintaining the pressure constant. Calculate the new volume of the gas at this low temperature.

(b) Define electrochemical series. Discuss calculation of the voltage of cell, giving one example. 04+04

7.(a) Explain structure of water and boron trifluoride by hybridization.

(b) Explain measurement of enthalpy of a reaction by glass calorilmeter. 04+04

8.(a) How is the vapour pressure of a liquid measured using Manometric method?

(b) The solubility of PbF_2 at 25°C is 0.64gdm^{-3}. Calculate Ksp of PbF_2. 04+04

9.(a) Explain Beckmann method to determine depression of Freezing point.

(b) How order of reaction can be measured by half life method. 04+04

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Inter - (Part-I)-A-2022

Roll No._____ to be filled in by the candidate

(For All Sessions)

Group - II

Paper Code	6	4	8	4

Chemistry (Objective Type)

RWP62-22

Time:20 Minutes **Marks:17**

NOTE: Write answers to the questions on objective answer sheet provided. Four possible answers A, B, C & 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 volume occupied by 16g of O_2 at S.T.P is:
(A) 22.4 dm^3 (B) 2.24 dm^3
(C) 11.2 dm^3 (D) 1.12 dm^3

2. According to VSEPR theory, the shape of SO_3 molecule is.
(A) Trigonal pyramidal (B) Bent or angular (C) Triangular planer (D) Tetrahedral

3. A filtration process could be very time consuming if were not aided by a gentle suction which is developed.
(A) If the paper covers the funnel up to its circumference (B) If the paper has got small sized pores in it
(C) If the stem of the funnel is large so that it dips into the filtrate (D) If the paper fits tightly

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

5. Which one of the following hydrocarbons has shortest C – C bond length?
(A) Ethyne (B) Ethene (C) Ethane (D) Benzene

6. NH_3 shows a maximum boiling point among the hydrides of Vth group elements due to:
(A) Enhanced electronegative character of nitrogen (B) Pyramidal structure of NH_3
(C) Lone – pairs of electrons present on nitrogen (D) Very small size of nitrogen

7. If the absolute temperature of a gas is doubled and the pressure is reduced to one half, the volume of the gas will.
(A) Remains unchanged (B) Reduced to $\frac{1}{4}$
(C) Increases four times (D) Be doubled

8. Splitting of spectral lines when atoms are subjected to strong magnetic field is called:
(A) Zeeman effect (B) Stark effect
(C) Photoelectric effect (D) Compton effect

9. Gases deviate from ideal behaviour at high pressure. Which of the following is correct for non-ideality?
(A) At high pressure, the gas molecules move in one direction only (B) At high pressure, the intermolecular attractions becomes significant
(C) At high pressure, the collisions between the gas molecules are much increased (D) At high pressure, the volume of the gas becomes insignificant

10. Dipole – dipole forces are present among the.
(A) Atoms of helium gas (B) Molecules of CCl_4
(C) Molecules of solid I_2 (D) Molecules of HCl

11. Which of the following statements is not correct about galvanic cell?
(A) Reduction occurs at cathode (B) Anode is negatively charged
(C) Cathode is positively charged (D) Reduction occurs at anode

12. Oxidation of nitric oxide with ozone has been shown to be:
(A) First order reaction (B) Pseudo first order reaction
(C) Second order reaction (D) Third order reaction

13. A solution of glucose is 10% W/v. The volume in which 1g mole of it is dissolved will be:
(A) 900Cm^3 (B) 200Cm^3
(C) 1.8dm^3 (D) 1dm^3

14. The aqueous solution of $BiCl_3$ is cloudy. The cloudness of $BiCl_3$ solution can be vanished by:
(A) Addition of $BiCl_3$ (B) Addition of H_2O
(C) Addition of HCl (D) Addition of both $BiCl_3$ and H_2O

15. 22g of CO_2 sample has:
(A) $\frac{1}{2}$ mole of O atoms (B) 1 mole of O atoms
(C) 1.5 moles of O atoms (D) 6.02×10^{23} molecules of CO_2

16. Which one of the following maybe employed as drying agent in a desiccator?
(A) P_2O_5 (B) Animal charcoal
(C) $KMnO_4$ (D) NH_4Cl

17. In endothermic reactions, the heat contents of:
(A) Products is more than that of reactants (B) Reactants is more than that of products
(C) Both (A) and (B) (D) Reactants and products are equal

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(For All Sessions)

Group - II

Chemistry (Essay Type)

Rwp-G2-22

Time: 2:40 Hours

Section - I

Marks:68

2- **Write short answers of any eight parts from the following.** 2 x 8 = 16

i. Write the formulas to determine the percentage of carbon and hydrogen in combustion analysis.

ii. How the molecular and empirical formulas are related to each other?

iii. Define gram molecule by giving two examples.

iv. Define sublimation and give examples.

v. Differentiate between adsorption and partition chromatography.

vi. Define qualitative and quantitative analysis.

vii. Define Avogadro's Law and give two examples.

viii. One dm^3 of H_2 and O_2 have different masses but occupy same volumes. Give reason

ix. Why the sum of mole fractions is always equal to unity?

x. Define law of mass action and give the equilibrium constant expression.

xi. Write the formula to calculate the percentage ionization of weak acids.

xii. Define Lowry Bronsted acid base concept.

3- **Write short answers of any eight parts from the following.** 2 x 8 = 16

i. In a very cold winter fish in the garden ponds owe their lives due to H-bonding. Justify.

ii. Water and ethanol can mix easily and in all proportions. Justify.

iii. Cleavage of the crystals is itself anisotropic behaviour. Justify.

iv. London dispersion forces are weaker than dipole – dipole forces. Why?

v. Differentiate between frequency and wave number.

vi. Write two importance of Mosely's law.

vii. What is Zeeman effect?

viii. Write down any two postulates of plank's quantum theory.

ix. Differentiate between Molarity and Molality.

x. What is fractional crystalization?

xi. The radio active decay is always first order reaction. Give reason.

xii. Differentiate between homogeneous and Heterogeneous catalysis.

4- **Write short answers of any six parts from the following.** 2 x 6 = 12

i. Name the factors influencing the electron affinity.

ii. Define orbital hybridization and name its types.

iii. Explain bond order for Helium and why it does not exist as He_2 molecule?

iv. Ionization energy decreases down the group. Why?

v. Define internal energy and point out; is it a state function or not?

vi. What do you mean by heat of solution; give a suitable example.

vii. Define state function, write names of two such functions.

viii. What do you mean by Standard Hydrogen Electrode (SHE).

ix. Impure Cu can be purified by electrolytic process, justify?

Section – II

8 x 3 = 24

NOTE : **Answer any three questions from the following.**

5.(a) What is limiting reactant, give examples and how it is identified.

(b) Explain measurement of e/m value of electron. 04+04

6.(a) Describe the charging and discharging of Lead Accumulator.

(b) Calculate the mass of 1 dm^3 of NH_3 gas at 30°C and 1000mm Hg pressure, considering that NH_3 is behaving ideally. 04+04

7.(a) Discuss Geometry of ethene $\left(C_2H_4\right)$ according to Sp^2 hybridization.

(b) How can you measure enthalpy of reaction by glass calorimeter. 04+04

8.(a) What is hydrogen bonding. Give its three applications.

(b) The solubility of CaF_2 in water at 25°C is found to be 2.05×10^{-4} mol dm^{-3}. What is value of Ksp at this temperature? 04+04

9.(a) Explain graphically depression of freezing point of a solvent by solute. Also write down its mathematical form.

(b) Clearly differentiate between Homogeneous and Heterogeneous catalysis. Give two examples of each. 04+04