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Roll No._____ to be filled in by the candidate

Inter - (Part-I)-A-2022

(For All Sessions)

Group - II

RwP G2-22

Paper Code | 6 | 4 | 8 | 4

Chemistry (Objective Type)

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) $900 Cm^3$ (B) $200 Cm^3$
    (C) $1.8 dm^3$ (D) $1 dm^3$

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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Chemistry (Essay Type)

Time: 2:40 Hours

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^oC and 1000mm Hg pressure, considering that NH_3 is behaving ideally.   04+04

7.(a) Discuss Geometry of ethene $\left(\underset{2}{C} \underset{4}{H} \right)$ 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^oC 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