FBD-11-I (G)

Roll No. : _____

Objective Paper Code **6481**

**Intermediate Part First (New Scheme)**

# CHEMISTRY ( Objective ) GROUP - I

Time: 20 Minutes Marks: 17

**Q.No.1** **You have four choices for each objective type question as A, B, C and D. The choice which you think is correct, fill the relevant circle in front of that question number on computerized answer sheet. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero marks in that question. Attempt as many questions as given in objective type question paper and leave other circles blank.**

| S.# | Questions | A | B | C | D |
|---|---|---|---|---|---|
| 1 | The largest number of molecules are present in: | 3.6g of $H_2O$ | 4.8g of $C_2H_5OH$ | 2.8g of CO | 5.4g of $N_2O_5$ |
| 2 | The number of moles of $CO_2$ which contain 8.0g of oxygen: | 0.25 | 0.50 | 1.00 | 1.50 |
| 3 | The comparative rates at which the solutes move in paper chromatography, depend on: | The size of paper | $R_f$ values of solutes | Temperature of the experiment | Size of chromatographic tank used |
| 4 | Pressure remaining constant, at which temperature the volume of a gas will become twice of what it is at 0°C? | 546°C | 200°C | 546K | 273K |
| 5 | The molar volume of $CO_2$ is maximum at: | STP | 127°C and 1 atm | 0°C and 2 atm | 273°C and 2 atm |
| 6 | Acetone and chloroform are soluble in each other due to: | Intermolecular hydrogen bonding | Instantaneous dipole | Ion-dipole interaction | All of these |
| 7 | The molecules of $CO_2$ in dry ice form the: | Ionic crystals | Covalent crystals | Molecular crystals | Any type of crystal |
| 8 | Orbitals having same energy are called: | Hybrid orbitals | Valence orbitals | Degenerate orbitals | d-orbitals |
| 9 | When 6d orbital is complete, the entering electron goes into: | 7f | 7s | 7p | 7d |
| 10 | The hydrogen halides that has the highest percentage of ionic character: | HCℓ | HBr | HF | HI |
| 11 | The number of bonds in nitrogen molecule is: | One sigma and one pi | Three sigma only | One sigma and two pi | Two sigma and one pi |
| 12 | Calorie is equivalent to: | 0.4184J | 41. 84J | 4.184J | 418.4J |
| 13 | The pH of $10^{-3}$ mol $dm^{-3}$ of an aqueous solution of $H_2SO_4$ is: | 3.0 | 2.7 | 2.0 | 1.5 |
| 14 | The molal boiling point constant is the ratio of the elevation in boiling point is: | Molarity | Molality | Mole fraction of solute | Mole fraction of solvent |
| 15 | Molarity of pure water is: | 1 | 18 | 55.5 | 6 |
| 16 | If the salt bridge is not used between two half cells, then the voltage: | Drops to zero | Decreases rapidly | Decreases slowly | Does not change |
| 17 | The unit of the rate constant is the same as that of the rate of reaction is: | Zero order reaction | First order reaction | Second order reaction | Third order reaction |

Intermediate Part First (New Scheme) Roll No. FRD-91-6119

# CHEMISTRY ( Subjective ) GROUP - I

Time: 02:40 Hours Marks: 68

## SECTION – I

**short answers of any EIGHT parts.** 16

What are molecular ions? How are they formed?
Define empirical formula. How is it related to molecular formula?
Define limiting reactant. How does it control the yield of product formed?
Define chromatography. Give its two applications.
How are coloured impurities removed from crystals?
Define absolute zero temperature.
Give four applications of plasma.
State Dalton's law of partial pressure. Give its mathematical form.
Calculate the numerical value of ideal gas constant 'R' in SI units.
Why is aqueous solution of $CuSO_4$ acidic in nature?
State Raoult's law in two different ways.
One molal solution of urea in water is dilute as compared to one molar solution of urea. Justify it.

**e short answers of any EIGHT parts.** 16

Water is liquid at room temperature while $H_2S$ is a gas. Comment.
Why the density of ice is less than water?
Why heat of vaporization of water is greater than $CH_4$ ?
How liquid crystals act as temperature sensor?
How will you prove that cathode rays travel in straight line?
Give reason for the production of positive rays.
Derive de-Broglie equation $\lambda = \frac{h}{mv}$.
Give two defects in Rutherford atomic model.
Prove that $pK_a + pK_b = 14$ at 25°C.
Calculate pH of $10^{-4}$ mol · $dm^{-3}$ of HCℓ.
Rate of reaction is an ever changing parameter. Give reason.
How does surface area effect the rate of reaction?

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**te short answers of any SIX parts.** 12

Why atomic radius is greater than cationic radius?
How ionization energy varies in periodic table?
$O_2$ molecule is paramagnetic. Explain.
Molecular orbital theory is superior to valence bond theory. Comment.
Prove that $\Delta E = q_v$
Define heat and work.
How is voltaic cell represented?
) Define standard electrode potential.
Write chemical reactions taking place in NICAD cell.

## SECTION – II Attempt any THREE questions. Each question carries 08 marks.

Define yield. How do we calculate the percentage yield of chemical reaction? Also mention the factors which are responsible for low yield of products. 04
Define hydrogen bonding. Give its three applications. 04

Assuming $NH_3$ gas to be ideal. Calculate its mass in grams if 1.00 $dm^3$ of $NH_3$ is enclosed in a container at 30°C and 1000 mmHg. 04
How charge on electron be measured by famous Millikan's oil drop experiment? 04

Define ionization energy. What factors do affect it? 04
State first law of thermodynamics. Write its mathematical expression. Prove that $\Delta H = q_p$ 04

What is the percentage ionization of acetic acid in a solution in which 0.1 mol of it has been dissolved per $dm^3$ of the solution. ($K_a = 1.85 \times 10^{-5}$) 04
Discuss four physical methods to determine the rate of reaction. 04

Define solubility curve. Explain different types of solubility curves with the help of graphs. 04
)Explain voltaic cell with the help of diagram and also discuss its working. 04

FBD-11-G2-19

Roll No. _____

Objective Paper Code **6488**

**Intermediate Part First (New Scheme)**

# CHEMISTRY (Objective) GROUP - II

Time: 20 Minutes Marks: 17

**Q.No.1** **You have four choices for each objective type question as A, B, C and D. The choice which you think is correct, fill the relevant circle in front of that question number on computerized answer sheet. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero marks in that question. Attempt as many questions as given in objective type question paper and leave other circles blank.**

| S.# | Questions | A | B | C | D |
|---|---|---|---|---|---|
| 1 | Splitting of spectral lines of hydrogen atoms under magnetic field is called: | Stark effect | Zeeman effect | Compton effect | Splitting effect |
| 2 | When up to 6d orbitals are filled with electrons, next entering electron goes to: | 7s | 7p | 7d | 7f |
| 3 | Ammonia ($NH_3$) shows maximum boiling point among hydrides of group 5A, it is due to: | Very small size of N atom | Least electronegative character of N atom | Most electronegative character of N atom | Pyramidal structure of $NH_3$ molecule |
| 4 | In order to mention the boiling point of water at 110°C, the external pressure should be: | Between 200 torr & 760 torr | Between 760 torr & 1200 torr | 765 torr | 760 torr |
| 5 | The molar volume of $O_2$ gas is maximum at: | STP | 127°C and 1 atm | 0.00°C and 2 atm | 273°C and 2 atm |
| 6 | Considering van derWaals constant "a" and "b", a real gas behaves as ideal if: | Both "a" and "b" are large | Both "a" and "b" are small | "a" is large but "b" is small | "a" is small but "b" is large |
| 7 | The comparative rate at which solute travels on chromatographic paper depends upon: | $R_f$ value | The size of paper | Mobile phase | Temperature |
| 8 | During combustion analysis $CO_2$ produced is absorbed by: | $Mg(C\ell O_4)_2$ | KOH(50%) | $CaC\ell_2$ | $P_2O_5$ |
| 9 | Fractional atomic mass is mainly due to: | Mass of atom is in fraction | Atomic mass is average mass of isobars | Elements mostly consist of isotopes having different fractional abundances | Atomic mass is average masses of isotopes |
| 10 | The rate law of a reaction is rate = $k[A]^2[B]$. if "A" is in large excess then order of reaction is: | 1 | 2 | 3 | 4 |
| 11 | Oxidation number of Cr in $K_2Cr_2O_7$ is: | − 2 | + 3 | + 6 | + 7 |
| 12 | Molarity of pure water is: | 1.00 | 6.00 | 18.0 | 55.5 |
| 13 | An azeotropic mixture of two liquids boils at lower temperature than either liquid when: | It shows negative deviation from Raoult's law | It shows positive deviation from Raoult's law | It is metastable | It is saturated |
| 14 | The pH of $1.0\times10^{-3}$ M $H_2SO_4$ solution is: | 1.5 | 2.0 | 2.7 | 3.0 |
| 15 | While $q_p$ is heat at constant pressure, $q_v$ is heat at constant volume then the relationship most probably correct is: | $q_p = q_v$ | $q_p + q_v = 0$ | $q_p < q_v$ | $q_p > q_v$ |
| 16 | Which species has unpaired electrons in its molecular orbitals | $B_2$ | $F_2$ | $N_2^-$ | $O_2^{2-}$ |
| 17 | Which molecule has zero dipole moment | BF | $CHCl_3$ | $H_2O$ | $NH_3$ |

FBD-12-G2-19

Intermediate Part First (New Scheme) Roll No _____

# CHEMISTRY ( Subjective ) GROUP - II

Time: 02:40 Hours Marks: 68

## SECTION – I

2. **Write short answers of any EIGHT parts.** 16
   (i) Define gram atom and gram formula.
   (ii) 2g $H_2$ , 16g $CH_4$ , 44g $CO_2$ occupy same volume. Why?
   (iii) How efficiency of chemical reaction be expressed?
   (iv) How crystals are derived by using filter paper?
   (v) Why there is need to crystallize crude products?
   (vi) State Joule-Thomson effect.
   (vii) $H_2$ and He cannot be liquefied by Lind's method. Why?
   (viii) Define the terms critical temperature and critical pressure.
   (ix) Give general principle of liquefaction of gasses.
   (x) Relative lowering in vapour pressure is independent of temperature. Explain.
   (xi) Define hydrates. How are they formed?
   (xii) Why hydration energy of $Mg^{++}$ ion is higher than $Na^{+1}$ ion?

3. **Write short answers of any EIGHT parts.** 16
   (i) Define dipole-dipole forces. Give examples.
   (ii) What is polarizability? How it affects London dispersion forces?
   (iii) HF is a weaker acid than HCℓ , HBr , HI. Justify it.
   (iv) Why evaporation causes cooling?
   (v) Write any two properties of positive rays.
   (vi) Calculate the mass of electron with help of e/m.
   (vii) Write two defects of Rutherford atomic model.
   (viii) What is continuous spectrum? Give example.
   (ix) Differentiate between reversible and irreversible reaction.
   (x) How direction of reaction is determined by $K_c$?
   (xi) Define average and instantaneous rate of reaction.
   (xii) Describe specific rate constant or velocity constant of a reaction.

4. **Write short answers of any SIX parts.** 12
   (i) 75.4pm is compromise distance between two hydrogen atoms. Justify it.
   (ii) Why dipole moment of $CO_2$ is zero but that of CO is 0.12D?
   (iii) Why energy of antibonding molecular orbitals are greater than that of bonding molecular orbitals?
   (iv) Discuss the trend of ionization energy in periodic table.
   (v) Describe spontaneous process. Give an example.
   (vi) Define enthalpy of atomization. Give an example.
   (vii) Lead accumulator is a chargeable battery. Justify.
   (viii) Give difference between electrolytic and voltaic cell.
   (ix) How copper can be purified?



## SECTION – II Attempt any THREE questions. Each question carries 08 marks.

5. (a) Define actual yield and theoretical yield. Why the actual yield is lesser than theoretical yield? Also give the formula to calculate the percent yield. 04
   (b) Write four properties of covalent solids. 04

6. (a) Calculate the density of $CH_4$ at 0°C and one atmospheric pressure. 04
   (b) Derive radius of revolving electron in nth orbit of H-atom on the basis of Bohr's atomic model. 04

7. (a) Explain the structure of the given compounds with the help of V.S.E.P.R theory (i) $NH_3$ (ii) $H_2O$ 04
   (b) How do you measure the heat of combustion of substance by Bomb Calorimeter? 04

8. (a) $N_2(g)$ and $H_2(g)$ combine to give $NH_3(g)$. The value of $K_c$ in this reaction at 500°C is $6.0 \times 10^{-2}$. 04
   Calculate the value of $K_c$ for this reaction. 04
   (b) Discuss any four factors which influence the rates of chemical reactions. 04

9. (a) Write the rules for assigning oxidation number to an element in a compound 04
   (b) How is lowering in vapour pressure as colligative property used to find out molecular mass of solutes? 04