FSD

Roll No. : _____

Objective
Paper Code
6485

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 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
2	If the salt bridge is not used between two half cells, then the voltage:	Drops to zero	Decreases rapidly	Decreases slowly	Does not change
3	Molarity of pure water is:	1	18	55.5	6
4	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
5	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
6	Calorie is equivalent to:	0.4184J	41. 84J	4.184J	418.4J
7	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
8	The hydrogen halides that has the highest percentage of ionic character:	HCℓ	HBr	HF	HI
9	When 6d orbital is complete, the entering electron goes into:	7f	7s	7p	7d
10	Orbitals having same energy are called:	Hybrid orbitals	Valence orbitals	Degenerate orbitals	d-orbitals
11	The molecules of CO_2 in dry ice form the:	Ionic crystals	Covalent crystals	Molecular crystals	Any type of crystal
12	Acetone and chloroform are soluble in each other due to:	Intermolecular hydrogen bonding	Instantaneous dipole	Ion-dipole interaction	All of these
13	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
14	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
15	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
16	The number of moles of CO_2 which contain 8.0g of oxygen:	0.25	0.50	1.00	1.50
17	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

Intermediate Part First (New Scheme) Roll No. _____

CHEMISTRY (Subjective) GROUP - I

Time: 02:40 Hours Marks: 68

SECTION – I

2. **Write short answers of any EIGHT parts.** 16
   (i) What are molecular ions? How are they formed?
   (ii) Define empirical formula. How is it related to molecular formula?
   (iii) Define limiting reactant. How does it control the yield of product formed?
   (iv) Define chromatography. Give its two applications.
   (v) How are coloured impurities removed from crystals?
   (vi) Define absolute zero temperature.
   (vii) Give four applications of plasma.
   (viii) State Dalton's law of partial pressure. Give its mathematical form.
   (ix) Calculate the numerical value of ideal gas constant 'R' in SI units.
   (x) Why is aqueous solution of $CuSO_4$ acidic in nature?
   (xi) State Raoult's law in two different ways.
   (xii) One molal solution of urea in water is dilute as compared to one molar solution of urea. Justify it.

3. **Write short answers of any EIGHT parts.** 16
   (i) Water is liquid at room temperature while H_2S is a gas. Comment.
   (ii) Why the density of ice is less than water?
   (iii) Why heat of vaporization of water is greater than CH_4 ?
   (iv) How liquid crystals act as temperature sensor?
   (v) How will you prove that cathode rays travel in straight line?
   (vi) Give reason for the production of positive rays.
   (vii) Derive de-Broglie equation $\lambda = \frac{h}{mv}$.
   (viii) Give two defects in Rutherford atomic model.
   (ix) Prove that $pK_a + pK_b = 14$ at 25°C.
   (x) Calculate pH of 10^{-4} mol · dm^{-3} of HCℓ.
   (xi) Rate of reaction is an ever changing parameter. Give reason.
   (xii) How does surface area effect the rate of reaction?

4. **Write short answers of any SIX parts.** 12
   (i) Why atomic radius is greater than cationic radius?
   (ii) How ionization energy varies in periodic table?
   (iii) O_2 molecule is paramagnetic. Explain.
   (iv) Molecular orbital theory is superior to valence bond theory. Comment.
   (v) Prove that $\Delta E = q_v$
   (vi) Define heat and work.
   (vii) How is voltaic cell represented?
   (viii) Define standard electrode potential.
   (ix) Write chemical reactions taking place in NICAD cell.

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

5. (a) 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
   (b) Define hydrogen bonding. Give its three applications. 04

6. (a) 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
   (b) How charge on electron be measured by famous Millikan's oil drop experiment? 04

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

8. (a) 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
   (b) Discuss four physical methods to determine the rate of reaction. 04

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

Intermediate Part Second (New Scheme) Roll No. 440403

CHEMISTRY (Subjective) GROUP - I

Time: 02:40 Hours Marks: 68

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SECTION – I

2. **Write short answers to any EIGHT parts.** 16

(i) Why the second value of electron affinity is usually shown with a positive sign?
(ii) What are amphoteric oxides? Give two examples.
(iii) Why 2% gypsum is added in grinding during the process of manufacturing of cement?
(iv) What is the effect of heat on ortho boric acid?
(v) Write any two points of importance of oxides of lead in paints.
(vi) Write formulas of (a) Litharge (b) Red lead.
(vii) Write two points of difference between red and white phosphorus.
(viii) Write two reactions to show that H_2SO_4 acts as oxidizing agent.
(ix) How does P_2O_3 react with water in cold and hot state?
(x) Define macronutrients of fertilizer with suitable examples.
(xi) What is the role of digestion step in the manufacture of paper?
(xii) Write conditions which are required for the formation of smog.

3. **Write short answers to any EIGHT parts.** 16

(i) Write two important uses of organic chemistry in daily life.
(ii) How does propyne react with (a) $AgNO_3$ / NH_4OH (b) $Cu_2C\ell_2$ / NH_4OH
(iii) How will you bring about the following conversion? Methane to Ethane
(iv) Write the structures of (a) Benzene (b) Naphthalene (c) Toluene (d) Biphenyl.
(v) What is meant by the terms (a) Aromatic (b) Halogenation?
(vi) Define (a) Nucleophile (b) Electrophile.
(vii) Write equation showing reaction of ethyl magnesium bromide with water.
(viii) Write the formulas of (a) 1-Butanol (b) 2-Butanol.
(ix) Why ethyl alcohol is liquid while methyl chloride is a gas?
(x) What is the difference between essential and non-essential amino acids?
(xi) Write the structural formulas of (a) Glycine (b) Alanine.
(xii) What is glacial acetic acid? Write its formula.

4. **Write short answers to any SIX parts.** 12

(i) Write balanced chemical reactions of Conc · H_2SO_4 with (a) Sodium bromide (B) Sodium chloride.
(ii) Give balanced chemical reaction of chlorine with cold dilute sodium hydroxide solution.
(iii) Which is stronger acid? $HC\ell O_3$ or $HBrO_3$ and why?
(iv) Define paramagnetism. Which two ions have the strongest paramagnetic behaviour?
(v) How is formaldehyde prepared in laboratory? Give its chemical reaction with necessary conditions.
(vi) Give a reaction which is used to protect a carbonyl group against strong alkaline oxidizing agents.
(vii) Define homopolymer with an example.
(viii) What is the difference between fats and oils?
(ix) Give the role of DNA and RNA in life.

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

5. (a) What are the improvements made in the Mendeleev's Period Table? 04
(b) Mention the properties of beryllium in which it does not resemble with its own family. 04

6. (a) How steel is manufactured by Bessemer's Process? 04
(b) What is acid rain? How does it affect our environment? 04

7. (a) How will you prepare ethane by Kolbe's method and from Grignard reagent? 04
(b) Describe nitration and bromination of benzene with mechanism. 04

8. (a) Starting from ethene, outline the reactions for the preparation of the following compounds. 04
(i) Ethyl dibromide (ii) Ethyne (iii) Ethane (iv) Ethylene glycol
(b) How can ethanol be prepared from (i) Molasses (ii) Starch? 04

9. (a) Write four important points of difference between S_N1 and S_N2 mechanism 04
(b) Explain with mechanism the addition of sodium bi-sulphite to acetone. Write utility of this reaction. 04

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Roll No. : _____

Objective Paper Code **6484**

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	Which molecule has zero dipole moment?	BF_3	$CHC\ell_3$	H_2O	NH_3
3	Which species has unpaired electrons in its molecular orbitals	B_2	F_2	N_2^{2-}	O_2^{2+}
4	While q_p is heat at constant pressure, q_v is heat at constant volume then the relationship most probably correct is:	$q_p = q_v$	$q_p + q_v = 0$	$q_p < q_v$	$q_p > q_v$
5	The pH of 1.0×10^{-3} M H_2SO_4 solution is:	1.5	2.0	2.7	3.0
6	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
7	Molarity of pure water is:	1.00	6.00	18.0	55.5
8	Oxidation number of Cr in $K_2Cr_2O_7$ is:	+ 2	+ 3	+ 6	+ 7
9	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
10	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
11	During combustion analysis CO_2 produced is absorbed by:	$Mg(C\ell O_3)_2$	KOH(50%)	$CaC\ell_2$	P_2O_5
12	The comparative rate at which solute travels on chromatographic paper depends upon:	R_f value	The size of paper	Mobile phase	Temperature
13	Considering van der Waals 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
14	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
15	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
16	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
17	When up to 6d orbitals are filled with electrons, next entering electron goes to:	7s	7p	7d	7f

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CHEMISTRY (Subjective) GROUP - II

Time: 02:40 Hours Marks: 68

FSD

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.
   (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 6.0×10^{-2}. Calculate the value of K_p 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