Roll No. : _____

Objective Paper Code **6485**

Intermediate Part First

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 number of neutrons present in $^{39}_{19}K$ is:	39	18	20 ●	19
2	Which is a pseudo solid?	CaF_2	Glass ●	$NaC\ell$	$KC\ell$
3	When $a \neq b \neq c$ and $\alpha = \gamma = 90°$, $\beta \neq 90°$ then it is:	Monoclinic ●	Diclinic	Triclinic	Polyclinic
4	Density of an ideal gas can be calculated by the formula:	PV = dRT	PM = dPV	$d = \frac{RT}{PM}$	$d = \frac{PM}{RT}$ ●
5	One atmosphere is equal to:	760mm of Hg ●	1000mm of Hg	760cm of Hg	20 psi
6	The comparative rates at which the solutes move in paper chromatography, depend on:	The size of the paper	R_f values of solutes ●	Temperature of the experiment	Size of the chromatogram
7	The drying agent used in desiccator is:	$NaC\ell$	KBr	$CaC\ell_2$ ●	$BaC\ell_2$
8	The number of moles of CO_2 which contain 8.0g oxygen:	0.25 ●	0.50	1.0	1.50
9	The mass of one mole of electrons is:	1.008g	0.55mg ●	0.184g	1.673mg
10	Glucose is converted into ethanol by the enzyme _____ present in yeast.	Urease	Invertase	Sucrose	Zymase ●
11	If the salt bridge is not used between two half cells, then the voltage:	Decrease rapidly	Decrease slowly	Does not change	Drops to zero ●
12	A solution of glucose is 10% $\frac{w}{v}$. The volume in which 1g mole of it is dissolved will be:	$1dm^3$	$1.8dm^3$ ●	$200cm^3$	$900cm^3$
13	pH of pure water is:	4.4	5.4	7.0 ●	8.0
14	One calorie is equivalent to:	0.4184J	41.84J	4.184J ●	418.4J
15	Which element has smaller size?	Na	K	Aℓ	Li ●
16	Which molecule has zero dipole moment?	NH_3	$CHC\ell_3$	H_2O	BF_3 ●
17	The number of electrons in the outermost shell of chloride ($C\ell^-$) ion is:	17	03	01	08 ●

1113-XI124-50000

Intermediate Part First Roll No. _____

pakcity.org CHEMISTRY (Subjective) GROUP - I

Time: 02:40 Hours Marks: 68

SECTION – I

2. **Write short answers of any EIGHT parts.** 16
   (i) Calculate average atomic mass of neon.
   (ii) Define molar volume. Give one example.
   (iii) What is the function of electric field in mass spectrometer?
   (iv) How crystals are dried in an oven?
   (v) Write any two uses of chromatography.
   (vi) Define crystallization.
   (vii) Write any four properties of gases.
   (viii) Convert 40°C into Kelvin scale.
   (ix) Write two faulty assumptions of kinetic molecular theory.
   (x) Differentiate between reversible and irreversible reactions.
   (xi) State law of mass action.
   (xii) State common ion effect.

3. **Write short answers of any EIGHT parts.** 16
   (i) What are dipole dipole forces? Give one example.
   (ii) Name the factors which affect the London forces.
   (iii) Cleavage of crystals is itself anisotropic behaviour. Explain.
   (iv) Why ice occupies 9% more volume than liquid water?
   (v) Why cathode rays are also called as electrons?
   (vi) Write any four properties of positive rays.
   (vii) Define spectrum and name any two types of spectrums.
   (viii) For azimuthal quantum number, $\ell = 2$ and $\ell = 3$; calculate total values of magnetic quantum number.
   (ix) Define solubility curve. Name its two types.
   (x) Sum of mole fractions of a mixture is always equal to unity. Justify.
   (xi) What do you mean by order of reaction? Give two examples.
   (xii) What is the effect of temperature on rate of chemical reaction?

4. **Write short answers of any SIX parts.** 12
   (i) Name the factors influencing the ionization energy.
   (ii) How sigma and pi bonds are formed?
   (iii) Draw the structure of ethene ($CH_2=CH_2$) using sp^2 hybridization approach.
   (iv) The bond angles of H_2O and NH_3 are not 109.5° like CH_4. Give reason.
   (v) Define system and surroundings.
   (vi) What is standard enthalpy of atomization? Give an example.
   (vii) Differentiate between endothermic and exothermic reactions.
   (viii) Define (a) Electrolysis (b) Oxidation state.
   (ix) A salt bridge maintains electrical neutrality in the cell. Give reason.

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

5. (a) How can we determine the percentage of carbon, hydrogen and oxygen in the given organic compound by combustion analysis? 04
   (b) Define the boiling point. Explain the variation of boiling point with external pressure. 04

6. (a) Discuss defects of Bohr's atomic model. 04
   (b) 250cm^3 of a sample of hydrogen effuses four times as rapidly as 250cm^3 of an unknown gas. Calculate the molar mass of unknown gas. 04

7. (a) Write postulates of VSEPR Theory. Also explain the structures of AB_3 type molecules in detail. (Any two molecules) 02,02
   (b) $N_2(g)$ 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: $N_2(g)+3H_2(g) \rightleftharpoons 2NH_3(g)$ 04

8. (a) Differentiate between spontaneous and non-spontaneous reactions with examples. 04
   (b) Write four important industrial applications of electrolysis. 04

9. (a) Describe phenol-water system in detail for partially miscible liquid. 04
   (b) Write any four characteristics of a catalyst. 04

1113-XI124-50000

Roll No. : _____

Objective Paper Code **6486**

Intermediate Part First

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	The wavenumber of the light emitted by a certain source is $2\times10^{6}\ m^{-1}$. The wavelength of this light will be:	500nm	500m	200nm	5×10^{7}m
2	Ionic solids are characterized by:	Low melting point	High vapour pressure	Good conductivity in solid state	Solubility in polar solvents
3	In order to mention the boiling point of water at 110°C, the external pressure should be:	Between 760 torr and 1200 torr	Between 200 torr and 760 torr	765 torr	Any value of pressure
4	Equal _____ of ideal gases at the same temperature and pressure contains _____ number of molecules.	Masses ; Equal	Volume ; Equal	Moles ; Unequal	Volume ; Unequal
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	Solvent extraction is particularly useful technique for the separation when the product to be separated is:	Non-volatile or thermally unstable	Volatile or thermally stable	Non-volatile or thermally stable	Volatile or thermally unstable
7	The most common laboratory example of solvent extraction is called:	Ether extraction	Distillation	Sublimation	Crystallization
8	1 mole of glucose has _____ number of hydrogen atoms.	6×22.414	$12\times6.02\times10^{23}$	$6\times6.02\times10^{23}$	$24\times6.02\times10^{23}$
9	The number of moles of CO_2 which contains 8g of oxygen:	0.25	0.50	1.0	1.50
10	In zero order reaction, the rate is independent of:	Temperature of reaction	Concentration of reactants	Concentration of products	None of these
11	If a strip of Cu metal is placed in a solution of $FeSO_4$:	Cu will be deposited	Fe is precipitated out	"Cu and Fe" both dissolves	No reaction takes place
12	The molal boiling point constant is the ratio of the elevation in boiling point to the:	Molarity	Molality	Mole fraction of solvent	Mole fraction of solute
13	Which combination is an acidic buffer?	A $HC\ell + NaC\ell$		C $NH_4OH + NH_4C\ell$	
		B $CH_3COOH + CH_3COONa$		D $NaOH + NaC\ell$	
14	Which system is endothermic as well as spontaneous?	A $H_2O(\ell) \rightarrow H_2O(g)$		C $N_2(g) + O_2(g) \rightleftharpoons 2NO(g)$	
		B $H_2O(g) \rightarrow H_2O(\ell)$		D $NaOH(aq) + HC\ell(aq) \rightarrow NaC\ell(aq) + H_2O(\ell)$	
15	Which molecule has zero dipole moment?	BF_3	H_2O	NH_3	$CHC\ell_3$
16	The bond order of Ne_2 is:	Two	Three	One	Zero
17	When 3d orbital is completely filled the entering electron goes to:	4s	4p	4f	5s

1114-XI124-3000

Intermediate Part First Roll No. _____

pakcity.org

CHEMISTRY (Subjective) GROUP - II

Time: 02:40 Hours Marks: 68

SECTION – I

2. **Write short answers of any EIGHT parts.** 16
   (i) Many reactions taking place in our surrounding involve limiting reactant. Justify with examples.
   (ii) Define mole with example.
   (iii) Discuss reason for low actual yield.
   (iv) Describe sintered glass crucible.
   (v) Discuss folding of filter paper briefly.
   (vi) Give uses of chromatography.
   (vii) Define effusion with one example.
   (viii) Explain Boyl's law from kinetic molecular theory of gases.
   (ix) Derive units of 'a' and 'b' used in van der Waals equation of real gas.
   (x) How K_c is used to predict direction of reaction?
   (xi) Discuss effect of pressure change on reaction $2SO_2(g)+O_2(g) \rightleftharpoons 2SO_3(g)$
   (xii) Define pK_a and pK_b

3. **Write short answers of any EIGHT parts.** 16
   (i) Complete these nuclear reactions: (a) ${}^{4}_{2}He + {}^{9}_{4}Be \rightarrow$ (b) ${}^{14}_{7}N + {}^{1}_{0}n \rightarrow$
   (ii) Differentiate between continuous and line spectrum.
   (iii) Calculate ionization energy of H-atom.
   (iv) Give relationship between (a) Energy and Frequency (b) Frequency and wavelength
   (v) What are advantages of vacuum distillation?
   (vi) Evaporation is a cooling process. Explain why?
   (vii) The crystals showing isomorphism mostly have the same atomic ratios. Explain the statement.
   (viii) Molecular solids are relatively soft. Why?
   (ix) Define upper consulate temperature.
   (x) What are azeotropic mixture?
   (xi) What do you mean by poisoning of a catalyst?
   (xii) What do you mean by heterogeneous catalysis? Give two examples.

4. **Write short answers of any SIX parts.** 12
   (i) Why size of anion is always larger than its neutral atom?
   (ii) Why second ionization energy is greater than first?
   (iii) Define bond length. Give two factors affecting bond length.
   (iv) Define bond order. Give its formula.
   (v) Burning of candle is spontaneous process. Justify.
   (vi) Define enthalpy of combustion. Give one example.
   (vii) Why enthalpy of some compounds cannot be measured directly?
   (viii) What is anodized aluminum? Give its use.
   (ix) What is the function of salt bridge?

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

5. (a) What is limiting reactant? How does it control the quantity of the product formed? Explain with three examples. 04
   (b) What are covalent solids? Discuss six properties of covalent solids in detail. 04

6. (a) What pressure is exerted by a mixture of 2.00g of H_2 and 8.00g of N_2 at 273K in a $10dm^3$ vessel? 04
   (b) Write four defects of Bohr's model. 04

7. (a) Define orbital hybridization and explain the structure of ethyne (C_2H_2) according to hybridization concept. 01,03
   (b) The solubility product of Ag_2CrO_4 is 2.6×10^{-2} at 25°C. Calculate the solubility of the compound. 04

8. (a) Explain Hess's law of constant heat summation giving one example. 04
   (b) Describe the construction and working of galvanic cell. 04

9. (a) Explain the measurement of boiling point elevation by Landsberger's method. 04
   (b) Explain the effect of concentration of reactants on rate of reaction. 04

1114-XI124-3000

Roll No. : _____

Objective
Paper Code
6481

Intermediate Part First

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.acf**

S.#	Questions	A	B	C	D
1	Which is a molecular ion?	CH_4^+	$A\ell^{3+}$	Na^+	Ca^{2+}
2	Largest number of molecules are present in:	4.8g of C_2H_5OH	2.8g of CO	5.4g of N_2O_5	3.6g of H_2O
3	Most common solvent used in solvent extraction is:	Acetone	Ethanol	Ether	Methanol
4	Equal mosses of methane and oxygen are mixed in an empty container at 25°C. The fraction of total pressure exerted by oxygen is:	$\frac{1}{9}$	$\frac{1}{3}$	$\frac{8}{9}$	$\frac{16}{17}$
5	1 atmosphere is equal to:	760mm of Hg	1000mm of Hg	760cm of Hg	20 Psi
6	Ionic solids are characterized by:	Low melting point	Solubility in polar solvents	High vapour pressure	Good conductivity in solid state
7	Liquid crystals are used in the display of:	Neon signs	Fluorescent bulbs	T.V. displays	Lightning discharge
8	In the ground state of an atom the electron is present:	In the nucleus	In second shell	Nearest to the nucleus	Farthest from nucleus
9	Bond order of N_2 molecule is:	01	02	03	04
10	If an endothermic reaction is allowed to take place very fast in the air, the temperature of the surrounding air:	Decreases	Increases	Remains constant	Remains unchanged
11	When a bond is formed energy is:	Absorbed	Released	Neither absorbed nor released	Remains constant
12	An excess of aqueous silver nitrate is added to aqueous barium chloride and precipitate in removed by filtration, what are the main ions in the filtrate:	Ag^+ and NO_3^- only	Ba^+ and NO_3^- only	Ba^{2+}, NO_3^- and $C\ell^-$	Ag^+, Ba^{2+} and NO_3^-
13	A solution which resists to change its pH is called as:	Buffer solution	Acid solution	Standard solution	Basic solution
14	A solution of glucose is 10% w/v. The volume in which 1g mole is dissolved will be:	1 dm^3	1.8 dm^3	200 cm^3	900 cm^3
15	The oxidation number of O-atom in OF_2 molecule is:	−1	−2	−3	+2
16	In silver oxide battery cathode is made up of:	Zn metal	Silver oxide	Graphite	Potassium hydroxide
17	Which enzyme catalysis urea?	Invertase	Zymase	Urease	Lipase

Intermediate Part First

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 ions? Under what conditions are they produced?
(ii) What is the justification of two strong peaks in the mass spectrum of bromine, while for iodine only one peak at 127amu is indicated?
(iii) What is the atomic mass unit? Give its value in grams.
(iv) What is the physical significance of van der Waals' constants 'a' and 'b'? Give their units.
(v) Define pressure and give its two units.
(vi) How absolute zero is explained by drawing graph?
(vii) What is the origin of line spectrum?
(viii) Define Moseley's law. Write importance of Moseley's law.
(ix) Differentiate between Stark and Zeeman effects.
(x) Why burning of a candle is a spontaneous process?
(xi) Differentiate between internal energy and enthalpy.
(xii) What is thermochemical equation? What information do they convey?

3. Write short answers of any EIGHT parts. 16

(i) Define molarity. Give its formula.
(ii) Define critical solution temperature. Give its value for water-aniline system.
(iii) What are liquids practically immiscible? Give one example.
(iv) Define order of reaction. Give example of second order reaction.
(v) What is electrical conductivity and dilatometric method for determination of rate of reaction?
(vi) What is negative catalyst and autocatalyst? Give one example of each.
(vii) What is gooch crucible? For what type of crystals, it is used?
(viii) What is ether extraction?
(ix) What is partition chromatography and adsorption chromatography?
(x) Why iodine is solid while fluorine and chlorine are gases?
(xi) How decomposition of a sensitive liquid can be avoided?
(xii) Define unit cell. What are unit cell dimensions?

4. Write short answers of any SIX parts. 12

(i) Define ionization energy and electron affinity.
(ii) Why the bond angle of H_2O and NH_3 are not 109.5° like that of CH_4 although O and N atoms are sp^3 hybridized?
(iii) What is octet rule? Give example.
(iv) Define law of mass action.
(v) What happens to the directions of a reversible reaction? When the ratio of concentration is less than actual K_c?
(vi) Why the solubility of glucose in water is increased by increasing the temperature?
(vii) What is salt bridge? Give example.
(viii) How does electrochemical series tells us the distinction between the oxidizing and reducing agents?
(ix) Why the product of electrolysis in molten electrolyte are different from the products of electrolysis in the solution state?

SECTION – II

Attempt any THREE questions. Each question carries 08 marks.

5. (a) Write a note on limiting reactant. Explain it giving at least two examples. 02,01,01
(b) 250cm^3 of the sample of hydrogen effuses four times as rapidly as 250cm^3 of an unknown gas. Calculate the molar mass of unknown gas. 04

6. (a) What are London dispersion forces? Give factors affecting them specially for halogens and hydrocarbons. 02,02
(b) Describe the measurement of enthalpy of a reaction by bomb calorimeter with diagram. 03,01

7. (a) How $\frac{e}{m}$ value of electron was measured by J.J. Thomson? 04
(b) The solubility of PbF_2 is 0.64 g/dm^3. Calculate K_{sp} of PbF_2. Atomic mass of Pb = 207 , F = 19. 04

8. (a) Write the four postulates of "VSEPR" theory. 04
(b) Explain four industrial applications of electrolysis. 04

9. (a) Describe Raults law. Explain when both the components are volatile. 04
(b) Describe homogeneous and heterogeneous catalysis. 04

Roll No. : _____

Faisalabad Board-2023

Objective
Paper Code
6484

Intermediate Part First

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.coa**

S.#	Questions	A	B	C	D
1	Indicate the catalyst used for the reaction: $HCOOH \rightarrow H_2O + CO$	Cu	MnO_2	Pt	$A\ell_2O_3$
2	If the salt bridge is not used between two half cells, then the voltage:	Decreases rapidly	Decreases slowly	Does not change	Drops to zero
3	The reaction at cathode during the electrolysis of dil. H_2SO_4 with Pt electrodes is:	Oxidation	Reduction	Both oxidation and reduction	Neither oxidation nor reduction
4	Which solution has the highest boiling point?	5.85% solution of $NaC\ell$	18.0% solution of glucose	6.0% solution of urea	All have the same boiling point
5	When H_2S is added to $HC\ell$ aqueous solution, the ionization of H_2S:	Increases	Remains constant	Decreases	Increases rapidly
6	An excess of aqueous silver nitrate is added to aqueous barium chloride and precipitate is removed by filtration. What are the main ions in the filtrate?	Ag^+ and NO_3^- only	Ba^{2+} and NO_3^- only	Ba^{2+}, NO_3^- and $C\ell^-$	Ag^+, Ba^{2+} and NO_3^-
7	The change in heat energy of a chemical reaction at constant temperature and pressure is called:	Internal energy change	Bond energy	Enthalpy change	Heat of sublimation
8	If an endothermic reaction is allowed to take place very rapidly in the air, the temperature of the surrounding air:	Decreases	Increases	Remains constant	Remains unchanged
9	The number of bonds in nitrogen molecule is:	One sigma and one pi	One sigma and two pi	Three sigma only	Two sigma and one pi
10	In the ground state of an atom, the electron is present:	In the nucleus	In the second shell	Nearest to the nucleus	Farthest from the nucleus
11	NaF and MgO are isomorphs of each other and exist in:	Tetragonal form	Rhombohedral form	Orthorhombic form	Cubic form
12	London dispersion forces are the only forces present among the:	Molecules of water in liquid state	Atoms of He in gaseous state at high temperature	Molecules of hydrogen chloride gas	Molecules of solid iodine
13	The value of R in $NmK^{-1}mol^{-1}$ is:	1.987	8.3143	0.0821	62.4
14	A real gas obeying van der Waals equation will resemble ideal gas if:	Both "a" and "b" are small	Both "a" and "b" are large	"a" is small and "b" is large	"a" is large and "b" is small
15	The stationary phase in adsorption chromatography is:	Solid	Water	Organic liquid	Gas
16	The mass of water formed when 2g of H_2 and 64g of O_2 are combined together is:	68g	36g	18g	66g
17	27g of $A\ell$ will react completely with how much mass of O_2 to produce $A\ell_2O_3$?	32g of oxygen	24g of oxygen	16g of oxygen	8g of oxygen

Intermediate Part First 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. Give example.
   (ii) How many molecules are present in 3.6 gram of H_2O?
   (iii) Mg atom is twice heavier than that of carbon atom. How?
   (iv) Define Charles's Law. Give its mathematical form.
   (v) What is the physical significance of van der Waals' constants "a" and "b". Give their units.
   (vi) Write any two applications of plasma.
   (vii) Justify that the distance gaps between different orbits go on increasing from the lower to the higher orbits.
   (viii) Why the positive rays are called canal rays?
   (ix) Calculate mass of electron by using e/m value.
   (x) Define exothermic reaction. Give example.
   (xi) What are spontaneous and non-spontaneous reactions? Give example.
   (xii) Prove that: $q_p = \Delta H$

3. **Write short answers of any EIGHT parts.** 16
   (i) Give any two qualities of an ideal solution.
   (ii) Prove that: $\frac{\Delta p}{p^\circ} = x_2$
   (iii) What is meant by liquids practically immiscible?
   (iv) What is meant by catalytic poisoning?
   (v) Define rate of reaction. Give its units.
   (vi) How order of reaction is determined by a method of large excess?
   (vii) What is solvent extraction?
   (viii) How moderate cooling is advantageous over slow cooling in crystallization process?
   (ix) What is the significance of distribution coefficient in chromatography?
   (x) Ice floats over water. Justify it.
   (xi) Show hydrogen bonding in alcohol and water.
   (xii) Define liquid crystals with an example.

4. **Write short answers of any SIX parts.** 12
   (i) Why 2nd ionization energy value is greater than 1st?
   (ii) Define bond energy. Give example.
   (iii) Draw molecular orbital diagram of nitrogen molecule.
   (iv) Define solubility product.
   (v) State Le-Chatelier's principle.
   (vi) Justify that chemical equilibrium is dynamic in nature.
   (vii) Write two functions of salt bridge.
   (viii) Define electrode potential.
   (ix) What is meant by E.M.F of cell?

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

5. (a) What is combustion analysis? How the percentages of various elements present in an organic compounds are determined? 04
   (b) What pressure is exerted by a mixture of 2.00g of H_2 and 8.00g of N_2 at 273K in a $10dm^3$ vessel? 04

6. (a) Describe the measurement of vapour pressure by manometric method with diagram. 03,01
   (b) How the enthalpy of combustion of substance can be measured by bomb calorimeter. Explain with diagram. 03,01

7. (a) Define and explain: (i) Atomic emission spectrum (ii) Atomic absorption spectrum 04
   (b) $N_2(g)$ 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

8. (a) Define hybridization and explain hybridization in NH_3. 01,03
   (b) Write note on alkaline battery. 04

9. (a) Differentiate between hydration and hydrolysis. Describe with two examples in each case. 02,02
   (b) How does the Arrhenius equation help us to calculate the energy of activation of a reaction. 04

Faisalabad Board-2022

Roll No. : _____

Objective
Paper Code
6483

Intermediate Part First - 903

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.coi**

S.#	Questions	A	B	C	D
1	If rate equation of reaction $2A + B \rightarrow$ Product, is rate = $K[A]^2[B]$ and A is present in large excess, then order of reaction is:	1	2	3	4
2	The oxidation state of 'Mn' in $KMnO_4$ is:	+7	+6	+2	+5
3	18g glucose dissolved in 90gm of H_2O has relative lowering of vapour pressure equal to:	$\frac{18}{90}$	$\frac{1}{6}$	$\frac{10}{51}$	$\frac{1}{51}$
4	pH of human blood is:	7.35	6.35	5.35	4.35
5	For a given process, the heat changes at constant pressure (q_p) and at constant volume (q_v) are related to each other as:	$q_p = q_v$	$q_p < q_v$	$q_p > q_v$	$q_p = \frac{q_v}{2}$
6	Which of the hydrogen halides has the highest percentage ionic character?	HCℓ	HBr	HF	HI
7	Ionization energy for $Mg \rightarrow Mg^+ + 1\bar{e}$ has $\Delta H = ?$	738 KJ mol^{-1}	238 KJ mol^{-1}	448 KJ mol^{-1}	138 KJ mol^{-1}
8	Splitting of spectral lines when atoms are subjected to strong electrical field is called:	Zeeman effect	Stark effect	Photoelectric effect	Compton effect
9	De-Brogli equation is represented as:	$h = \frac{\lambda}{mv}$	$m = \frac{h}{\lambda v}$	$m = \frac{h}{\lambda}$	$\lambda = \frac{h}{mv}$
10	The molecules of CO_2 in dry ice form the:	Ionic crystals	Covalent crystals	Molecular crystals	Metallic crystals
11	Density of ice is minimum at 4°C due to:	Empty spaces in structure of ice	Tetrahedral shape of crystal of ice	Large bond lengths	Large bond angles
12	The temperature of a natural plasma is about:	20000°C	1000°C	5000°C	10000°C
13	The deviation of a gas from ideal behaviour is maximum at:	0°C and 2.0 atm	–10°C and 5 atm	100°C and 2 atm	–10°C and 2 atm
14	The technique of chromatography is useful in organic synthesis for:	Separation	Isolation	Purification	All these
15	Separating funnel is used in the technique of analysis:	Crystallization	Filtration	Solvent extraction	Sublimation
16	Nickel has number of isotopes:	3	5	7	2
17	The number of moles of CO_2, which contain 8.0g of oxygen:	0.25	0.50	1.0	1.50

Intermediate Part First Roll No. _ _ _ _ _

CHEMISTRY (Subjective) GROUP - I

Time: 02:40 Hours Marks: 68

SECTION – I

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

(i) Magnesium atom is twice heavier than that of carbon atom. Justify it.
(ii) Many chemical reactions taking place in our surrounding involve the limiting reactants. Give examples.
(iii) Molecular formula is multiple of empirical formula. Give an example.
(iv) How is chromatography classified on the basis of stationary phases?
(v) Define sublimation. Give two examples.
(vi) Write names of four steps of crystallization.
(vii) Calculate the value of general gas constant (R) using S.I. units of pressure and volume.
(viii) What is Joule-Thomson effect?
(ix) Write quantitative definition of Charles's law.
(x) State Le-Chatelier's principle.
(xi) How does equilibrium constant tell about direction of reaction?
(xii) What is the effect of common ion on solubility? Give an example.

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

(i) Amorphous solid like glass is also super cooled liquid. Why?
(ii) Cleavage of crystal is itself anisotropic behaviour. Justify it.
(iii) Water and ethanol can mix easily in all proportions. Give reason.
(iv) In a cold winter the fish in garden ponds owe their lives to H-bonding. Explain.
(v) Define Hunds rule with an example.
(vi) Give out two defects of Rutherford Model of an atom.
(vii) Differentiate between Zeeman and Stark effect.
(viii) Define continuous spectrum with an example.
(ix) Why some of properties are called colligative?
(x) What are the conditions to obey colligative properties?
(xi) Define half life time (period) with an example.
(xii) How the surface area affect the rate of reaction?

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

(i) Why atomic radius cannot be determined precisely?
(ii) How ionization energy changes in periodic table?
(iii) What is coordinate covalent bond? Give one example.
(iv) Why bond order of Helium molecule is zero?
(v) Why enthalpy of neutralization is called enthalpy of formation of H_2O?
(vi) Define heat capacity of a body. Give its mathematical expressions.
(vii) What is enthalpy of reaction? Give example.
(viii) What is oxidation number? Give example.
(ix) Write the product obtained during electrolysis of $PbBr_2$.

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

(a) Describe combustion analysis. Also write formula to calculate percentage of carbon, hydrogen and oxygen. 02,02

(b) State Mosley's law. What is its importance? 01,03

(a) 250cm^3 of hydrogen gas is cooled from 127°C to –27°C keeping the pressure constant. Calculate the new volume of the gas at low temperature. 04

(b) Explain the construction and working of fuel cells. 04

(a) Give the assumptions and postulates of VSEPR theory. 1,3

(b) Define and explain Hess's law of constant heat summation with an example. 1,3

(a) Write the structure of ice. Why ice floats on water? 3,1

(b) The solubility product of Ag_2CrO_4 is 2.6×10^{-2} at 25°C. Calculate the solubility of the compound. 1,1,1,1

(a) How lowering of vapour pressure as colligative property is used to find out molecular mass of solute? 04

(b) Explain any four characteristics of a catalyst. 04

Roll No. :_____

Objective Paper Code **6486**

Intermediate Part First

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 circle. Cutting or filling two or more circles will result in zero marks in that question. Attempt as many questions as given objective type question paper and leave other circles blank.

S.#	Questions	A	B	C	D
1	Ionic solids are characterized by:	Low melting point	Good conductors in solid state	High vapour pressure	Solubility i polar solvents
2	London dispersion forces are present among the:	Molecules of liquid water	Molecule of hydrogen chloride gas	Molecule of solid iodine	All these
3	Value of R at STP:	8.21 dm^3 atm k^{-1} mol^{-1}	0.0821 dm^3 atm k^{-1} mol^{-1}	0.00821 dm^3 atm k^{-1} mol^{-1}	0.000821 dn atm k^{-1} mol
4	Gases deviate from ideal behaviour at high pressure because:	At high pressure, the gas molecule move in one direction only	At high pressure, the gas molecules move in all direction	At high pressure, there are significant attractive forces	All these
5	Coloured impurities appear during crystallization are removed by boiling the substance in the solvent with:	Silica gel	Benzoic acid	Powdered animal charcoal	$CaC\ell_2$
6	A technique in which a solute distribute itself in stationary phase and mobile phase is called:	Sublimation	Solvent extraction	Chromato-graphy	None of these
7	Many elements have fractional atomic masses. This is because:	Mass of the atom is itself fractional	Atomic mass are average masses of isobars	Atomic masses are average masses of isotopes	Atomic masse are average masses of isotopes proportional t their relative abundance
8	The volume occupied by 1.4g of N_2 at S.T.P. is:	2.24 dm^3	22.4 dm^3	1.12 dm^3	112 cm^3
9	The catalytic activity of enzyme is greatly enhanced by the presence of:	Inhibitors	Coenzymes	Activators	Coenzymes & activators
10	Oxidation number of 'Mn' in $KMnO_4$ is:	3	5	7	9
11	18gram glucose is dissolved in 90gram of water. The relative lowering of vapour pressure equal to:	$\frac{1}{5}$	5.1	$\frac{1}{51}$	6
12	pH of 10^{-4} mol dm^{-3} of $HC\ell$ is:	1	2	3	4
13	For the reaction $NaOH + HC\ell \rightarrow NaC\ell + H_2O$ the change in enthalpy is:	Heat of reaction	Heat of formation	Heat of neutralization	Heat of combustion
14	Bond order for He_2 is:	0	1	2	3
15	Ethyne molecule have:	Three π bonds between carbon atom	Three σ bonds between carbon atom	One σ and two π bonds between carbon atom	One π and two σ bonds between carbon atom
16	Quantum number value for 2p orbitals are:	$n=2, \ell=1$	$n=1, \ell=2$	$n=1, \ell=0$	$n=2, \ell=0$
17	In the ground state of an atom, the electron is present:	In the nucleus	In the second shell	Nearest to the nucleus	Farthest from the nucleus

Intermediate Part First

Roll No. _____

pakcity.org

CHEMISTRY (Subjective) GROUP - II

Time: 02:40 Hours Marks: 68

SECTION – I

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

(i) Define isotopes. Write isotopes of carbon.
(ii) Mg atom is twice heavier than carbon atom. Justify.
(iii) What is macro molecule? Give example.
(iv) Define partition chromatography with example.
(v) State distribution law.
(vi) How fluted filter paper is prepared?
(vii) State Charle's law. Write its mathematical form.
(viii) Define critical temperature and critical pressure of a substance.
(ix) Differentiate between natural and artificial plasma.
(x) Differentiate between reversible and irreversible reactions.
(xi) Define Buffer capacity.
(xii) What is the effect of common ion on solubility?

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

(i) Why is boiling point of H_2O greater than that of HF?
(ii) What are London forces? Give an example.
(iii) Define lattice energy. Give one example.
(iv) What are molecular solids? What type of interactions hold them together?
(v) Define spectrum. Give its two types.
(vi) The e/m values of positive rays for different gases are different but those for cathode rays, the e/m values are same. Why?
(vii) How are the neutrons involved in the conversion of $^{65}_{29}Cu$ into $^{66}_{30}Zn$?
(viii) What are x-rays? How are they produced?
(ix) Aqueous solution of $CuSO_4$ is acidic in nature. Give the reason.
(x) Why are $NaC\ell$ and KNO_3 used to lower the melting point of ice?
(xi) What are Pseudo first order reactions? Give one example.
(xii) How does the surface area of reactants affect the rate of reaction? Give an example.

Write short answers of any SIX parts. 12

(i) How does the electronegativity difference decide the nature of ionic bond?
(ii) Why an ionic bond is stronger than covalent bond?
(iii) Why the atomic radii increase down the group?
(iv) How the bond length is affected by hybridization?
(v) What is state and state function?
(vi) What do you mean by internal energy of chemical system?
(vii) Define surroundings and give examples.
(viii) Write the cathodic reaction in fuel cells.
(ix) Give the structure of anode and cathode in lead acid battery.

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

(a) Write various steps to calculate the empirical formula of a compound. 1,1,1,1
(b) What is Plank's Quantum Theory? Write its main points. 1,1,1,1

(a) 250cm^3 of the sample of hydrogen effuses four times as rapidly as 250cm^3 of an unknown gas. Calculate the molar mass of unknown gas. 04
(b) Describe fuel cells. Give their uses. 02,02

(a) Write postulates of M.O.T. and explain oxygen molecule by this theory. 04
(b) Explain first law of thermodynamics. 04

(a) What are liquid crystals? Give their uses. 04
(b) The solubility of CaF_2 in water at 25°C is found to be 2.05×10^{-4} mol dm^{-3}. What is the value of K_{sp} at this temperature? 04

(a) Give applications of elevation of boiling point and depression of freezing point. 04
(b) Explain rate determining step in detail. 04

Roll No. : _____

Objective
Paper Code
6485

Intermediate Part First

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 geometry of SO_2 molecule is:	Angular	Linear	Tetrahedral	Trigonal pyramid
2	Which one pair is isomorphic in nature:	$NaC\ell$, KBr	$CaC\ell_2$, $CaCO_3$	NaF , $MgC\ell_2$	Na_2CO_3 , $MgCO_3$
3	When water freezes at 0°C, its density decreases due to:	Cubic structure of ice	Empty spaces present in structure of ice	Change of bond length	Change of bond angle
4	Equal masses of methane and oxygen are mixed in an empty container at 25°C. The fraction of total pressure exerted by oxygen is:	$\frac{1}{3}$	$\frac{8}{9}$	$\frac{1}{9}$	$\frac{16}{17}$
5	Pressure remaining constant at which temperature the volume of a gas will become twice of what it is at 0°C?	546°C	546K	200°C	273K
6	Solvent extraction is an equilibrium process and it is controlled by:	Law of mass action	Distribution law	The amount of solvent used	The amount of solute
7	A beaker contains 9g of water. The number of H-atoms in it is:	N_A of atoms	$2 \times N_A$ of atoms	$\frac{1}{2} N_A$ of atoms	$3 \times N_A$ of atoms
8	27g of $A\ell$ will react completely with how much mass of O_2 to produce $A\ell_2O_3$?	8g of oxygen	20g of oxygen	24g of oxygen	32g of oxygen
9	The rate of reaction:	Increases as the reaction proceeds	Decreases as the reaction proceeds	Remains constant as the reaction proceeds	May decrease or increase as the reaction proceeds
10	The properties of substances which depend solely on number of particles present is known as:	Additive properties	Constitutive properties	Additive and constitutive properties	Colligative properties
11	Stronger the reducing agent, greater is the:	Oxidation potential	Reduction potential	Redox potential	Electromotive force of cell
12	A solution with pH = 2 is more acidic than a solution with pH = 6 by a factor of:	4	8	1000	10000
13	The value of Δn for the given equilibrium $N_2 + 3H_2 \rightleftharpoons 2NH_3$ is:	−2	+2	+1	+4
14	For a given process, the heat changes at constant pressure (q_p) and at constant volume (q_v) are related to each other as:	$q_p = q_v$	$q_p > q_v$	$q_p < q_v$	$q_p = \frac{q_v}{2}$
15	In ground state of an atom, the electron is present:	In the nucleus	In the second shell	Nearest to the nucleus	Farthest from the nucleus
16	Which is correct?	Idea of presence of neutron in an atom was provided by Chadwick	Neutron was discovered by using radioactive Beryllium	Fast neutrons having energy 1.2ev	Slow neutrons have energy above 1ev
17	The planer structure of BF_3 can be explained by the fact that BF_3 is:	sp-hybridized	sp^2-hybridized	sp^3-hybridized	dsp^2-hybridized

Intermediate Part First Roll No. _____

CHEMISTRY (Subjective) GROUP - I

Time: 02:40 Hours Marks: 68

SECTION – I

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

(i) Calculate mass in kilograms of 2.6×10^{20} molecules of SO_2.
(ii) Calculate mass in grams of 5.136 moles of Ag_2CO_3
(iii) Calculate mass in grams of 2.74 moles of $KMnO_4$
(iv) Define sublimation. Name two compounds which can be sublimed.
(v) Define (a) Solvent extraction (b) R_f value.
(vi) Derive the units for gas constant 'R' in general gas equation when pressure is in atmosphere and volume in dm^3.
(vii) Briefly discuss general gas equation.
(viii) Describe centigrade scale of thermometry.
(ix) Write two applications of Dalton's law of partial pressure.
(x) Define fractional distribution. Give one example.
(xi) What is non ideal solution? Give one example.
(xii) Define colligative properties. Name four colligative properties.

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

(i) Write six crystallographic elements of a tetragonal crystal system.
(ii) Explain crystal lattice briefly.
(iii) Define transition temperature giving one example.
(iv) Explain cleavage planes.
(v) Cathode rays are material particles. Explain it.
(vi) Write any two properties of neutron.
(vii) Explain continuous spectrum briefly.
(viii) Define atomic absorption spectrum giving one example.
(ix) Give one difference between reversible and irreversible reactions.
(x) Define pH and pOH.
(xi) Define instantaneous rate and average rate of a reaction.
(xii) Define order of a reaction giving one example.

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

(i) What is basic assumption of VSEPR theory.
(ii) Define coordinate covalent bond. Give example.
(iii) Define electron affinity. Give example.
(iv) Why NH_3 is a pyramidal molecule?
(v) What is system and surrounding?
(vi) Define enthalpy of combustion. Give example.
(vii) What is electrochemistry?
(viii) What is electrolytic conduction?
(ix) How electrochemical series is used to calculate voltage of cell? Give example.

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

5. (a) When lime stone is roasted, quicklime is produced according to following equation:

$$CaCO_3(g) \rightarrow CaO(g) + CO_2(g)$$

The actual yield of CaO is 2.5kg when 4.5kg of lime stone is roasted. Find its percentage yield. 04
(b) Define and explain factors affecting the London forces. 04

6. (a) How Dalton's law of partial pressure calculates the partial pressure of a gas? 04
(b) Explain measurement of e/m value of electron. 04

7. (a) Define covalent bond. Write its types with reference to polar covalent bond. 04
(b) What is the first law of thermodynamics? How does it explain that $q_v = \Delta E$? 04

8. (a) When 1.00 mole of steam and 1.00 mole of carbon monoxide are allowed to reach equilibrium, 33.3% of the equilibrium mixture is hydrogen. Calculate the value of K_p. State the units of K_p. 04
(b) Explain how Arrhenius equation tells us the effect of temperature on the rate constant. 04

9. (a) Explain the measurement of freezing point by Beckmann's freezing point apparatus. 04
(b) Define electrochemical series. Write its two applications. 04

Roll No. : _____

Objective
Paper Code
6486

Intermediate Part First

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	Bohr model of atom is contradicted by:	Plank's quantum theory	Dual nature of matter	Heisenberg's uncertainty principle	All of these
2	Quantum number values for 2p orbitals are:	$n=2, \ell=1$	$n=1, \ell=2$	$n=1, \ell=0$	$n=2, \ell=0$
3	Which is a pseudo solid?	CaF_2	Glass	$NaC\ell$	All of these
4	Which is not an isomorphic pair?	$NaNO_3$, KNO_3	MgO and NaF	K_2SO_4 and $K_2Cr_2O_7$	NaF and $CaC\ell_2$
5	Number of molecules in one dm^3 of water is close to:	$\frac{6.02}{22.4}\times10^{23}$	$\frac{12.04}{22.4}\times10^{23}$	$\frac{18}{22.4}\times10^{23}$	$55.6\times6.02\times10^{23}$
6	Equal masses of methane and oxygen are mixed in an empty container at 25°C. The fraction of total pressure exerted by oxygen is:	$\frac{1}{3}$	$\frac{8}{9}$	$\frac{1}{9}$	$\frac{16}{17}$
7	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 the chromatographic tank used
8	The ratio of actual yield to theoretical yield multiplied by 100 is called:	Complex yield	Experimental yield	%age yield	None of these
9	The calculation based on balanced chemical equation is called:	Complex calculation	Stoichiometric calculation	Non-stoichiometric calculation	None of these
10	The unit of the rate constant is the same as that of the rate of reaction in:	First order reaction	Second order reaction	Zero order reaction	Third order reaction
11	If the salt bridge is not used between two half cells, then voltage:	Decrease rapidly	Decrease slowly	Does not change	Drops to zero
12	The pH of buffers can be calculated by:	Henderson equation	Nerst equation	Kinetic equation	Arrhenius equation
13	Less soluble $KC\ell O_3$ is precipitated from its solution by common ion effect on adding:	$HC\ell$	$KC\ell$	H_2S	$NaC\ell$
14	For which system does the equilibrium constant, K_c has units of $(concentration)^{-1}$:	$N_2+3H_2 \rightleftharpoons 2NH_3$	$H_2+I_2 \rightleftharpoons 2HI$	$2NO_2 \rightleftharpoons N_2O_4$	$2HF \rightleftharpoons H_2+F_2$
15	If an endothermic reaction is allowed to take place very rapidly in the air, the temperature of the surrounding air:	Remains constant	Increases	Decreases	Remains unchanged
16	Octet rule is not followed in the formation of:	NF_3	CF_4	$CC\ell_4$	$PC\ell_5$
17	Which species has unpaired electrons in antibonding molecular orbitals?	O_2^{2+}	N_2^{2-}	B_2	F_2

Roll No. _____

CHEMISTRY (Subjective) GROUP - II

Time: 02:40 Hours Marks: 68

SECTION – I

2. Write short answers of any EIGHT parts. 16

(i) No individual neon atom has a mass of 20.18 amu.
(ii) What is a limiting reactant?
(iii) What is percentage yield? Give its importance.
(iv) Define sublimation. Give example.
(v) What is solvent extraction?
(vi) Derive Avogadro's Law from KMT.
(vii) Give characteristics of plasma.
(viii) What is law of distribution of velocities?
(ix) What is centigrade scale of temperature?
(x) Give two differences between ideal and non-ideal solutions.
(xi) Define solubility and solubility curves.
(xii) Define enthalpy or heat of solution.

3. Write short answers of any EIGHT parts. 16

(i) Define polymorphism by giving one example.
(ii) Define unit cell. Write dimensions of unit cell.
(iii) What is difference between crystal and crystallite?
(iv) Why H_2O is liquid and H_2S is gas at room temperature?
(v) Why the positive rays are also called canal rays?
(vi) Why alpha rays are bounced back in Rutherford experiment?
(vii) Calculate mass of electron by using e/m value.
(viii) What is difference between orbit and orbital?
(ix) Define acidic and basic buffers.
(x) Define common ion effect by giving one example.
(xi) Define rate determining step by giving one example.
(xii) Define energy of activation.

4. Write short answers of any SIX parts. 12

(i) How electronegativity helps us to understand the nature of bond?
(ii) Differentiate between ionic and covalent bond.
(iii) Why some covalent bonds are polar while others are non-polar?
(iv) What is oxonium ion? How it is formed?
(v) What is enthalpy?
(vi) What is standard enthalpy of a reaction?
(vii) Calculate oxidation number of manganese in $KMnO_4$.
(viii) Calculate oxidation number of sulphur in sulphate ions.
(ix) Define electrode potential.

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

5. (a) Calculate the number of grams of K_2SO_4 and water produced when 14g of KOH are reacted with excess of H_2SO_4. $2KOH + H_2SO_4 \rightarrow K_2SO_4 + 2H_2O$ 04

(b) Explain the following properties of crystalline solids. Give one example in each case: 04
(i) Anisotropy (ii) Symmetry (iii) Polymorphism (iv) Habit of a crystal

6. (a) Derive general gas equation for one mole of a gas from gas laws at S.T.P. 04

(b) What is spectrum? Explain atomic emission spectrum and atomic absorption spectrum. 04

7. (a) Give the postulates of VSEPR theory. 04

(b) Explain these terms: (i) Standard heat of neutralization (ii) Standard enthalpy of solution 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) (i) Define activation energy and activated complex. (ii) What is meant by specific rate constant? 04

9. (a) Explain Landsberger's method for the measurement of boiling point elevation. 04

(b) Define electrochemical series. Write its any two applications. 04

Faisalabad Board-2019

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.....

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?

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

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 1.0×10^{-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

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.
(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

Faisalabad Board-2018

Roll No. : _____

Objective
Paper Code
6481

Intermediate Part First (New Scheme)
CHEMISTRY (Objective)
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 number of moles of hydrogen atoms in 92g alcohol (C_2H_5OH) are:	5 moles	6 moles	10 moles	12 moles
2	The number of moles of CO_2 which contain 8.0g of oxygen:	1.50	1.0	0.50	0.25
3	The comparative rates at which the solute move in paper chromatography depend on:	Size of paper	R_f values	Temperature	Size of chromatographic tank
4	The gases show more deviation at:	Low temperature and low pressure	High temperature and low pressure	High temperature and high pressure	Low temperature and high pressure
5	The liquid having highest boiling point is:	Hydrofluoric acid	Water	Hydrogen sulphide	Ammonia
6	Which impurity makes the shape of sodium chloride crystal needle like:	$MgSO_4$	Urea	Glucose	$MgCO_3$
7	When one beta (β) particle is emitted from the nucleus of an atom its:	Atomic number increases by 1	Atomic number decreases by 1	Atomic mass increases by 1	Atomic mass decreases by 1
8	The charge on proton is:	1.6022×10^{-11}C	1.6022×10^{11}C	1.6022×10^{-19}C	1.6022×10^{19}C
9	In nitrogen molecule (N_2), each nitrogen atom contributes in sharing for formation of bond:	One electron	Two electrons	Three electrons	Four electrons
10	Which one has highest value of ionization energy:	Be	C	O	F
11	The pressure of oxygen in bomb calorimeter is:	10 atm.	15 atm.	20 atm.	25 atm.
12	For which system does the equilibrium constant, K_c has units of $(concentration)^{-1}$:	A $N_2+3H_2 \rightleftharpoons 2NH_3$		C $2NO_2 \rightleftharpoons N_2O_4$	
		B $H_2+I_2 \rightleftharpoons 2HI$		D $PC\ell_5 \rightleftharpoons PC\ell_3+C\ell_2$	
13	Which one affects the value of K_c ?	Concentration	Temperature	Pressure	Catalyst
14	One molar solution of glucose ($C_6H_{12}O_6$) contains the amount of solute in $500cm^3$ solution:	180g	90g	45g	270g
15	Molarity of pure water is:	1	18	55.5	6
16	The oxidation state of oxygen in KO_2 is:	−1	−2	−½	+2
17	The order of reaction for the reaction $2N_2O_5 \rightarrow 2N_2O_4 + O_2$ is:	Zero order	First order	Second order	Third order

 Intermediate Part First (New Scheme) Roll No. _____

CHEMISTRY (Subjective)

Time: 02:40 Hours Marks: 68

SECTION – I

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

(i) Differentiate between cation and anion.
(ii) Many chemical reactions taking place in our surrounding involve the limiting reactants. Justify it.
(iii) How is percentage (%) yield calculated?
(iv) What is R_f value? Give its unit if any.
(v) How can you dry crystals by different ways?
(vi) Calculate numerical value of R in S.I. units, for one mole of a gas at STP.
(vii) Explain Avogadro's law briefly.
(viii) Define diffusion and effusion of gases.
(ix) What happens to the acidic and basic properties of aqueous solutions when pH varies from zero to 14?
(x) Prepare acidic and basic buffers with one example in each case.
(xi) What will be the effect of increase of pressure and temperature on the following reaction?

$$N_{2(g)} + 3H_{2(g)} \rightleftharpoons 2NH_{3(g)} \quad \Delta H = -92.46kJ$$

(xii) Define solubility product constant and derive solubility product expression for Ag_2CrO_4

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

(i) Define allotropy. Give two allotropic forms of carbon.
(ii) Explain that evaporation is a cooling process.
(iii) Define isomorphism with an example.
(iv) What are Debye forces? Explain.
(v) What is bond order? Give an example.
(vi) The dipole-moment of CO_2 is zero but that of CO is 0.12D. Give reason.
(vii) Define Pi (π) bond with an example.
(viii) Bond distance is the compromise distance between two atoms. Explain.
(ix) Prove that $\Delta E = q_v$
(x) Define spontaneous reactions with two examples.
(xi) What is meant by conjugate solutions?
(xii) Define molarity and molality.

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

(i) State Moseley's law. Give its mathematical formula.
(ii) Give two defects of Rutherford's atomic model.
(iii) Why is it necessary to decrease the pressure in the discharge tube to get the cathode rays?
(iv) Write electronic configuration of Cu(29) and Sc(21).
(v) What are secondary cells? Give two examples.
(vi) What is oxidation number? Calculate oxidation number of Mn in $KMnO_4$
(vii) How does a salt bridge maintain the electrical neutrality in a galvanic cell?
(viii) What is heterogeneous catalysis? Give one example.
(ix) Define half life period of a reaction. Give one example.

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

5. (a) What are metallic solids? Discuss their properties. 04
(b) 8.657g of compound were decomposed into elements and gave 5.217g of carbon, 0.962g of hydrogen, 2.478g of oxygen. Calculate the percentage composition of the compound under study. 04

6. (a) Define plasma state. How is it formed? Describe its four applications. 04
(b) Derive the general formula to calculate the radius of 'nth' orbit of H-atom by using Bohr's atomic model. 04

7. (a) Define dipole moment. Give its applications. 04
(b) Define and explain Hess's law of constant heat summation with two examples. 04

8. (a) Define law of mass action. Derive equilibrium constant expression for a given reversible reaction: 04

$$aA + bB \rightleftharpoons cC + dD$$

(b) What is standard hydrogen electrode (SHE)? How is it used to measure the electrode potential of Zinc (Zn). 04

9. (a) 3g of a non-volatile, non-electrolyte solute 'X' are dissolved in 50gm of ether (molar mass = 74) at 293K. The vapour pressure of ether falls from 442 torr to 426 torr. Under these conditions calculate molar mass of solute 'X' 04
(b) What is meant by energy of activation? Explain its importance for chemical reactions. 04