

Sign. Dy. Supdnt.

Fictitious Roll No. (For Office Use)

Sign. Candidate

## CHEMISTRY

(INTERMEDIATE)

(PART - I)

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019/1

Marks : 17

Time : 20 Minutes

(OBJECTIVE PART)

Note:- Write your Roll No. in space provided. Over writing, cutting, using of lead pencil

will result in loss of marks. All questions are to be attempted.

1- Each question has four possible answers, Tick (✓) the correct answer. (17)

1	Which one of the following is temperature dependent;			
A	Molarity	B	Molality	C Mole fraction D ppm
2	Oxidation state of oxygen in potassium super oxide is;			
A	-2	B	$+\frac{1}{2}$	C 0 D $-\frac{1}{2}$
3	The rate of reaction;			
A	Increases as reaction proceeds	B	Decreases as the reaction proceeds	C Remains the same as the reaction proceeds D May increase or decrease as reaction proceeds
4	The number of moles of CO <sub>2</sub> which contain 8.0g of oxygen;			
A	0.25	B	0.50	C 1.0 D 1.50
5	The volume occupied by 1.4g of N <sub>2</sub> at S.T.P. is;			
A	2.24 dm <sup>3</sup>	B	22.4 dm <sup>3</sup>	C 1.12 dm <sup>3</sup> D 112 cm <sup>3</sup>
6	Which one of the following is not purified by sublimation;			
A	Naphthalene	B	Silicon dioxide	C I <sub>2</sub> D Benzoic acid
7	Number of Molecules in one dm <sup>3</sup> of water is close to;			
A	$\frac{6.02 \times 10^{23}}{22.4}$	B	$\frac{12.04 \times 10^{23}}{22.4}$	C $\frac{18 \times 10^{23}}{22.4}$ D $55.6 \times 6.02 \times 10^{23}$
8	The order of the rate of diffusion of gases NH <sub>3</sub> , SO <sub>2</sub> , Cl <sub>2</sub> and CO <sub>2</sub> is;			
A	NH <sub>3</sub> > SO <sub>2</sub> > Cl <sub>2</sub> > CO <sub>2</sub>	B	NH <sub>3</sub> > CO <sub>2</sub> > SO <sub>2</sub> > Cl <sub>2</sub>	C Cl <sub>2</sub> > SO <sub>2</sub> > CO <sub>2</sub> > NH <sub>3</sub> D NH <sub>3</sub> > CO <sub>2</sub> > Cl <sub>2</sub> > SO <sub>2</sub>
9	In order to mention the boiling point of water at 110 °C, the external pressure should be;			
A	Between 760 torr and 1200 torr	B	Between 200 torr and 760 torr	C 765 torr D Any value of pressure
10	At 323 torr Boiling point of H <sub>2</sub> O is;			
A	120 °C	B	100 °C	C 69 °C D 110 °C
11	Orbitals having same energy are called;			
A	Hybrid orbitals	B	Valence orbitals	C d-orbitals D Degenerate orbitals
12	When 6d orbital is complete, the entering electron goes into;			
A	7f	B	7s	C 7p D 7d
13	Which of the following species has unpaired electrons in anti bonding molecular orbitals;			
A	O <sub>2</sub> <sup>2+</sup>	B	N <sub>2</sub> <sup>2-</sup>	C B <sub>2</sub> D F <sub>2</sub>
14	Which of the hydrogen halide has the highest percentage of ionic character;			
A	HCl	B	HBr	C HF D HI
15	For a given reaction, the heat change at constant pressure and at constant volume are related to each other as;			
A	q <sub>p</sub> = q <sub>v</sub>	B	q <sub>p</sub> < q <sub>v</sub>	C q <sub>p</sub> > q <sub>v</sub> D q <sub>p</sub> = $\frac{q_v}{2}$
16	pH of pure water is;			
A	12	B	4.8	C 7.0 D 55.5
17	Which one of the following is not a colligative property;			
A	Lowering of vapour pressure	B	Elevation of B.P	C Depression of Freezing point D Boiling point of solution

(The End)

**SECTION - I**

2- Write short answers of any eight parts. (2 x 8 = 16)

i	Define molecular ion. Give its two examples.	ii	Amount of product is controlled by limiting reactant why?
iii	23 g of sodium and 238 g of uranium have equal number of atoms in them. Justify.	iv	State distribution law.
v	Write down four properties of an ideal solution chosen for crystallization.	vi	Give any two applications of Dalton's Law of partial pressures.
vii	Derive Avogadro's Law from kinetic molecular theory of gases.	viii	Define critical temperature (T <sub>c</sub> ).
ix	Write down any two applications of plasma.	x	Why the aqueous solution of CuSO <sub>4</sub> is acidic?
xi	Define molality. Give its formula.	xii	Differentiate between zeotropic and azeotropic mixtures.

3- Write short answers of any eight parts. (2 x 8 = 16)

i	Explain action of soaps and detergents in light of hydrogen bonding.	ii	Evaporation causes cooling. Justify.
iii	Define Boiling point and molar heat of vapourization.	iv	Write down names of different types of crystalline solids.
v	What is atomic emission spectrum?	vi	State Moseley's Law and writes its mathematical equation.
vii	Derive de-Broglie's wave equation $\lambda = \frac{h}{mv}$	viii	State Heisenberg's uncertainty principle. Give its mathematical equation.
ix	What is acidic buffer? Give one example.	x	Write down Henderson's equation for acidic buffer and basic buffer.
xi	Explain specific rate constant of a reaction.	xii	Write down the four names of different methods to determine order of a reaction and discuss any two methods in short.

4- Write short answers of any six parts. (2 x 6 = 12)

i	Why $\pi$ bond is weaker than $\sigma$ bond?	ii	Define Electron affinity with examples.
iii	Why lone pair of electrons occupy more space than bond pair of electrons?	iv	Why dipole moment of CO <sub>2</sub> is zero but that of SO <sub>2</sub> is 1.6D?
v	Differentiate between Spontaneous and Non-Spontaneous reactions.	vi	Why it is necessary to mention physical state of reactants and products in a thermochemical reaction?
vii	Differentiate between Electrolytic and Galvanic cells.	viii	Determine the oxidation number of Cr in K <sub>2</sub> Cr <sub>2</sub> O <sub>7</sub> .
ix	Write two functions of salt bridge.		

**SECTION - II**

Note:- Attempt any three questions. (8 x 3 = 24)

5	(a)	Explain Combustion Analysis of an organic compound along with diagram.	(04)
	(b)	How Vapour Pressure of a liquid can be measured with the help of Manometric Method. Explain with diagram.	(04)
6	(a)	Calculate the density of methane gas at 0°C and 1 atmospheric pressure.	(04)
	(b)	Describe Millikan's oil drop method for determination of charge on electron.	(04)
7	(a)	Define dipole moment. Give its mathematical equation. What are its different units?	(04)
	(b)	Define Hess's Law of constant heat summation. Explain it with an example.	(04)
8	(a)	Define half-life period. How is half-life method used to determine the order of reaction?	(04)
	(b)	What is the percentage ionization of acetic acid in a solution in which 0.1 moles of it has been dissolved per dm <sup>3</sup> of solution. K <sub>a</sub> for CH <sub>3</sub> COOH=1.85×10 <sup>-5</sup>	(04)
9	(a)	Describe Raoult's Law in three different ways, when solute is non volatile and solvent is volatile.	(04)
	(b)	Define oxidation number, also write at least six rules for assigning oxidation number.	(04)

(The End)