

R-443

Paper Code: _____

ESKP-xi1901
CHEMISTRY - Part I

1	1
2	2
3	3

Time: 3 hours

Marks: 75

Note: There are THREE Sections in this paper i.e. A, B & C. Attempt Section-A and return it to the Superintendent within the given time. No marks will be awarded for cutting, erasing and overwriting. Mobile Phones are strictly prohibited in Examination Hall.

Time: 20 minutes

Section-A

Marks: 18

QNo.1 Select the correct option and shade (A,B,C,D) in the given Bubble Answer Sheet.

- i. Dipole-induced dipole forces are also called _____
 A- dipole-dipole forces B- Ion dipole forces C- Debye forces D- Condon dispersion forces
- ii. The mass of electron in kg is _____
 A- 9.1×10^{-18} kg B- 9.1×10^{-31} kg C- 1.67×10^{-27} kg D- 1.67×10^{-31} kg
- iii. The shape of CO₂ molecule is similar to the _____
 A- H₂S B- SO₂ C- BeF₂ D- SnCl₂
- iv. Spontaneous reactions are _____
 A- Reversible B- Irreversible C- Not completed D- None
- v. The value of PH and POH of pure water at 25°C is _____
 A- 14 B- 7 C- 1×10^{-14} D- 1×10^{14}
- vi. The unit of equilibrium constant K_c for the reaction $H_2 + I_2 \rightleftharpoons 2HI$ is _____
 A- mol⁻¹.dm³ B- mol⁻².dm³ C- mol.dm⁻³ D- None
- vii. When 0.1 mole of solute dissolved in 100g of solvent its molarity will be _____
 A- 0.1 molal B- 1.00 molal C- 0.5 molal D- None
- viii. Stronger the oxidizing agent greater is the _____
 A- Oxidation potential B- Reduction potential C- EMP of cell D- Redox potential
- ix. The vapour pressure of methanol at 40°C is less than _____
 A- Water B- Glycerin C- Ether D- All of them
- x. At the same temperature and pressure which of the following gas has greatest density?
 A- CO₂ B- SO₂ C- Cl₂ D- H₂O
- xi. The shape of Ammonia molecule is _____
 A- Linear B- Pyramedal C- Tetrahedral D- Trigonal
- xii. For which of the following species Bohr's theory dos not apply?
 A- H B- H⁺ C- He⁺ D- Li²⁺
- xiii. Endothermic reactions are favoured in the forward ditecture _____
 A- Cooling B- Freezing C- Heating D- Adding catalyst
- xiv. Very large value of K_a means the solution is _____
 A- Strong acid B- Weak acid C- Weak base D- Strong base
- xv. In ice cream, sugar is _____
 A- Solute B- Mixture C- Solvent D- None
- xvi. Percentage of Nitrogen in NH₃ is _____
 A- $14/34 \times 100$ B- $14/17 \times 100$ C- $3/17 \times 100$ D- $3/34 \times 100$
- xvii. The number of moles of CO₂ which contain 16g Oxygen is _____
 A- 0.25 mole B- 1 mole C- 0.5 mole D- 1.5 mole
- xviii. Normal temperature and prossure (STP) of gas refers to _____
 A- 273k & 76mmHg B- 273°C & 760mmHg C- 273k & 760mmHg D- 273°C & 76mmHg

Note: Time allowed 2:40 hours

SECTION - B

Marks: 40

Q2: Answer any TEN parts. Each part carries equal marks.

- i. Calculate the mole fraction of each component in the following solutions:
 - a) 2.5mole H₂O + 1.5mole NaCl
 - b) 500g H₂O + 600g C₆H₁₂O₆
- ii. SHE acts as anode with CU electrode but acts as cathode when connected to Zn electrode. Explain
- iii. Why all the collisions between the reactants do not leads to the reaction.
- iv. What is the H⁺ and OH⁻ ions concentration of a solution which has pH = 4.877
- v. What is the difference between orbit and orbitals?
- vi. Why bond energies of polar molecules are greater than non-polar molecules?
- vii. What is percentage composition? Calculate percentage composition for C₆H₁₂O₆.
- viii. Why temperature of a boiling liquid does not raise at its boiling points?
- ix. O₂ molecule is paramagnetic. Why?
- x. What pressure is exerted by a mixture of 2g He 16g of O₂ and 10g of CO₂ at 10°C in a 5dm³ vessel?
- xi. Plasma is a fourth state of matter. Elaborate
- xii. The change in concentration of reactants does not change the value of equilibrium constant permanently. Elaborate
- xiii. What is Molarity? Calculate the molarity of 2g of NaOH dissolved in water and the volume diluted to 100cm³.

SECTION - C

Marks: 27

Note: Attempt any THREE of the following. All questions carry equal marks.

- Q3:
 - a) What are quantum numbers? Discuss their significance. (5)
 - b) Every particle is associated with wave like character. Explain (2)
 - c) Calculate the wavelength of a body of mass 1×10^{-7} g moving with velocity of light. (2)
($h = 6.62 \times 10^{-34}$ J.s)
- Q4:
 - a) Differentiate between bonding and anti-bonding molecular orbitals. (4)
 - b) What information can be obtained from correct bond order of molecule? (3)
 - c) Draw MOT diagram for N₂ molecule. (2)
- Q5:
 - a) What is Le-Chatelier's principle? Discuss the effect of temperature on equilibrium of a Exo and Endothermic reactions with suitable examples. (2 + 4)
 - b) The equilibrium mixture contains 1 mole of PCl₅, 0.3 mole of PCl₃ and 0.08 mole of Cl₂ in 10L flask. Calculate K_c. (3)
- Q6:
 - a) Balance the following equations by Half Reaction Method. (4)
 - i. $\text{H}_2\text{O}_2 + \text{MnO}_4^- + \text{H}^+ \rightarrow \text{Mn}^{2+} + \text{O}_2 + \text{H}_2\text{O}$
 - ii. $\text{Zn} + \text{Cr}_2\text{O}_7^{2-} + \text{H}^+ \rightarrow \text{Zn}^{+2} + \text{Cr}^{+3} + \text{H}_2\text{O}$
 - b) What is corrosion? How it can be prevented? (3)
 - c) How can we measure Electrode Potential of SHE? (2)