

Roll No. _____ to be filled in by the candidate.

Paper Code 2 4 8 1

Sessions: 2015-2017, 2016-2018 & 2017-2019

Chemistry (Objective Type)

RWP

Time: 20 Minutes

Marks: 17

NOTE: Write answers to the questions on objective answer sheet provided. Four possible answers A, B, C & D to each question are given. Which answer you consider correct, fill the corresponding circle A, B, C or D given in front of each question with Marker or pen ink on the answer sheet provided.

- The mass of one mole of electrons is:
(A) 1.008 mg (B) 0.55 mg (C) 0.184 mg (D) 1.673 mg
- The atomicity of $C_6H_{12}O_6$ is:
(A) 6 (B) 12 (C) 3 (D) 24
- The comparative rate at which the solute moves in paper chromatography depends on:
(A) the size of paper (B) R_f value of solutes
(C) Temperature of the experiment (D) Size of chromatographic tank used
- The order of the rate of diffusion of gases NH_3 , SO_2 , Cl_2 and CO_2 is:
(A) $NH_3 > SO_2 > Cl_2 > CO_2$ (B) $NH_3 > CO_2 > SO_2 > Cl_2$ (C) $SO_2 > NH_3 > CO_2 > Cl_2$ (D) $CO_2 > SO_2 > Cl_2 > NH_3$
- The number of molecules in one dm^3 of water is close to:
(A) $\frac{6.02}{22.4} \times 10^{23}$ (B) $\frac{12.04}{22.4} \times 10^{23}$ (C) $\frac{18}{22.4} \times 10^{23}$ (D) $55.6 \times 6.02 \times 10^{23}$
- In order to mention the boiling point of water at $110^\circ C$, the external pressure should be:
(A) between 760 torr and 1200 torr (B) between 200 torr and 760 torr
(C) 765 torr (D) 620 torr
- The molecules of CO_2 in dry ice form the:
(A) Ionic crystals (B) Covalent crystals
(C) Molecular crystals (D) Metallic crystals
- The nature of the positive rays depends on:
(A) nature of the electrode (B) nature of the discharge tube
(C) nature of the residual gas (D) all these
- When 6d orbital is complete, the entering electron goes into:
(A) 7 f (B) 7 s (C) 7 p (D) 7 d
- The number of bonds in nitrogen molecule is:
(A) one σ and one π (B) one σ and two π (C) three σ only (D) two σ and one π
- Which of the following has zero dipole moment?
(A) NH_3 (B) $CHCl_3$ (C) H_2O (D) BF_3
- The change in heat energy of a chemical reaction at constant temperature and pressure is called:
(A) enthalpy change (B) heat of sublimation (C) bond energy (D) internal energy change
- For which system does the equilibrium constant, K_c has units of (concentration) $^{-1}$?
(A) $N_2 + 3H_2 \rightleftharpoons 2NH_3$ (B) $H_2 + I_2 \rightleftharpoons 2HI$ (C) $2NO_2 \rightleftharpoons N_2O_4$ (D) $2HF \rightleftharpoons H_2 + F_2$
- The pH of 10^{-3} mol dm^{-3} of an aqueous solution of H_2SO_4 is:
(A) 3.0 (B) 2.7 (C) 2.0 (D) 1.5
- Molarity of pure water is:
(A) 1 (B) 18 (C) 55.5 (D) 6
- Stronger is the oxidizing agent, greater is the:
(A) Oxidation potential (B) Reduction potential (C) Redox potential (D) E.M.F of the cell
- The unit of the rate constant is the same as that of the rate of reaction in:
(A) first order reaction (B) second order reaction (C) zero order reaction (D) third order reaction

RWP

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Sessions: 2015-2017, 2016-2018 & 2017-2019

Chemistry (Essay Type)

Time: 2:40 Hours

Marks: 68

Section - I**2- Write short answers of any eight parts from the following.**

2 x 8 = 16

- Write the names of any four methods employed for the separation of isotopes.
- Law of conservation of mass has to be obeyed during stoichiometric calculations. Justify it.
- What is the difference between adsorption and partition chromatography.
- Hydrogen and helium are ideal at room temperature, but SO_2 and Cl_2 are non ideal. How do you explain it?
- Justify that the volume of given mass of a gas becomes theoretically zero at 273°C .
- What is buffer solution? Give types of buffer solution with their composition.
- What do you know about gram atom?
- Define solvent extraction and partition law.
- Write any two methods for drying the crystals.
- Why pilots feel uncomfortable breathing at high altitude?
- How do buffers act? Give example of acidic buffer.
- Prove that $\text{P}K_a + \text{P}K_b = 14$. at 25°C .

3- Write short answers of any eight parts from the following.

2 x 8 = 16

- How is dynamic equilibrium established during evaporation of a liquid in a closed vessel at constant temperature?
- Why is boiling point of water different in Murree and Mount Everest?
- Justify that one molal solution of urea in H_2O is dilute as compared to one molar solution of urea but the number of particles of solute is same?
- Why the concentration term of molality is independent of temperature but molarity depends upon temperature?
- Differentiate between Continuous spectrum and Line spectrum?
- Calculate mass of electron by using its value of charge and e/m value.
- How was neutron discovered by James Chadwick? Prove it by a nuclear reaction.
- How is caustic soda obtained by electrolysis of aqueous solution of NaCl ? Write only the chemical reactions occurring at different electrodes.
- Define oxidation number and calculate oxidation number of chromium in K_2CrO_4 .
- Why do earthenware vessels keep water cool?
- Define isomorphism and give one example.
- What is Bohr's atomic model? Give its two postulates.

4- Write short answers of any six parts from the following.

2 x 6 = 12

- Why Cationic radius is smaller than atomic radius of atom?
- Differentiate between polar and non-polar covalent bond.
- Differentiate between endothermic and exothermic reactions.
- Why does O_2 show paramagnetic character?
- Why is Pi -bond weaker than Sigma bond?
- Define Thermochemical equation.
- How can half life be used to determine order of reaction?
- Discuss a reaction to explain specification of Catalyst.
- Discuss two characteristics of enzyme.

Section - II**NOTE: Answer any three questions from the following.**

8x3=24

- (a) Ascorbic acid (vitamin C) contains 40.92% carbon, 4.58% hydrogen and 54.5% of oxygen by mass. What is the empirical formula of ascorbic acid? 4
(b) Write down any four properties of Ionic solids. 4
- (a) Give the statement of Dalton's Law of partial pressure. How does this law help to find out the partial pressure in the mixture of gases? 4
(b) Explain Millikan's oil drop experiment to determine the charge on electron. 4
- (a) Describe measurement of enthalpy of a reaction with bomb calorimeter. 4
(b) Explain paramagnetic behaviour of oxygen molecule on the basis of Molecular Orbital Theory. 4
- (a) $\text{N}_2(\text{g})$ and $\text{H}_2(\text{g})$ combine to give $\text{NH}_3(\text{g})$. 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. 4
(b) Describe four uses of electrolysis process in industries. 4
- (a) Discuss Raoult's law for the solution in which both components are volatile. 4
(b) What is catalysis? Explain its types with one example of each. 4