

B.Sc. Semester - 1 (NEP-2020) Examination

OCT/NOV-2024

CHE: Introductory Chemistry (Major-1)

Time: 2:00 Hours

Marks: 50

Instructions:

1. All questions are compulsory.
2. Figures to the right indicate marks.

Que-1 Answer the following questions: (10)

- (a) State and explain rules for filling of electrons in atomic orbitals.
- (b) Explain: Heisenberg's uncertainty principle

OR

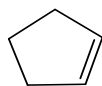
Que-1 Answer the following questions:

- (a) Explain quantum numbers in details.
- (b) Calculate uncertainty in momentum if uncertainty in its position is $1 \text{ \AA}$ (10^{-10} m).

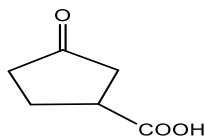
Que-2 Answer the following questions: (10)

- (a) Explain following electronic displacements in organic molecules.
(i) Inductive effect (ii) Hyperconjugation.
- (b) Give IUPAC name of the following

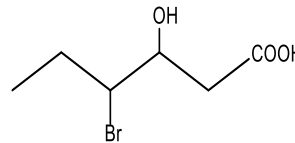
(i)



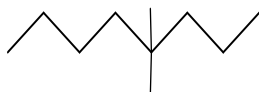
(ii)



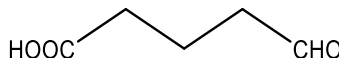
(iii)



(iv)



(v)



OR

Que-2 Answer the following questions:

- (a) Write a short note on (i) Carbocation (ii) Carbanion
- (b) Explain substitution and elimination reaction with example.

Que-3 Answer the following questions: (10)

- (a) Define molarity and molality and explain the difference between primary and secondary standards in the preparation of solutions.
- (b) Give definition of Catalyst and explain Homogeneous and Heterogeneous Catalysis.

OR

Que-3 Answer the following questions:

- (a) Define Normality and calculate the normality of a solution prepared by dissolving 4.9 grams of sulfuric acid (H_2SO_4) in enough water to make 250 mL of solution. (Molar mass of $\text{H}_2\text{SO}_4 = 98 \text{ g/mol}$).
- (b) Give any five differences between Physisorption and Chemisorption.

Que-4 Answer the following questions: (10)

- (a) Explain periodicity of oxidation states.
- (b) Explain Homolytic and Heterolytic fission.

OR

Que-4 Answer the following questions:

- (a) Explain general trends of periodic properties in terms of electronegativity and explain determination of electronegativity by Mullikan method.
- (b) Explain Addition and Rearrangement reaction with example.

Que-5 Answer the following questions:

(10)

- (a) Explain curly arrow rules with proper examples.
- (b) Write any two characteristics of Catalyst and Explain energy profile diagram of reaction with and without catalyst.

OR

Que-5 Answer the following questions:

- (a) Explain Nucleophilic and Electrophilic reactions with proper examples.
- (b) Derive equation for Langmuir Adsorption Isotherm and its modification at high pressure and low pressure.
