

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

January-2024

Introductory Chemistry (MDC)

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) Define: Quantum number. Explain Principal quantum number and Angular quantum number.

(B) Discuss sp^2 and sp^3 hybridization with example.

OR

Que.1 Answer the following questions.

(A) Write and explain Aufbau principle and Hund's rule of maximum multiplicity.

(B) Explain energy level diagram of N_2 molecule and calculate its bond order.

Que.2 Answer the following questions. (10)

(A) Give three methods of preparation of each of carbocation and free-radicals.

(B) Give the difference between Enantiomers and Diastereomers.

OR

Que.2 Answer the following questions.

(A) Write a note on 'Homolytic bond-fission' and 'Heterolytic bond-fission'.

(B) Give the difference between SN^1 and SN^2 reactions.

Que.3 Answer the following questions. (10)

(A) Define: Catalyst. Discuss Homogeneous and Heterogeneous catalysis with examples.

(B) What is colloid? Write any five applications of it.

OR

Que.3 Answer the following questions.

(A) Define oxidation and reduction (with respect to oxygen, hydrogen and electron) with examples.

(B) Write a note on purification of colloidal solution by any two methods.

Que.4 Answer the following questions. (10)

(A) Write and explain De-Broglie's equation and Heisenberg's uncertainty principle with equation.

(B) Explain Wurtz reaction and Wurtz-Fittig reaction for the formation of alkane.

OR

Que.4 Answer the following questions.

(A) Draw the structures of ammonia and water. Write total number of electron pairs, bond pairs, lone pairs and shape of each molecule.

(B) What is Mesomeric effect? Explain positive and negative mesomeric effects for aromatic compounds.

Que.5 Answer the following questions. (10)

(A) Define primary and secondary standards with three examples each. Write characteristics of primary standards.

(B) Define the following terms.

i). Molarity

ii). Molality

iii). Constitutional Isomers

iv). Lyophilic Colloids

v). Lyophobic Colloids

OR

Que.5 Answer the following questions.

(A) Write a note on working of Lithium-ion Battery.

(B) Give the structure of following organic compounds.

i). 4-Hydroxypentanoic acid

ii). 4-Methylhex-4-ene-1-yne

iii). 3-Ethyl-5-methyloctane

iv). Butane dioicacid

v). 2-Chloro-hept-1-ene
