

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

January-2024

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) Derive Schrodinger's wave equation. (05)

(B) (i) Write a note on Aufbau Principle. (03)

(ii) Calculate the wave-length (in Å) associated with a particle having mass 8.30×10^{-33} kg moving with velocity of 1.12×10^8 m/sec. ($h = 6.626 \times 10^{-34}$ J S) (02)

OR

Que.1 Answer the following questions. (10)

(A) Write a note on Principal quantum number & Magnetic quantum number. (05)

(B) (i) Write a note on Hund's rule of maximum multiplicity. (02)

(ii) Calculate the uncertainty of position of a particle, if the uncertainty of its velocity is 4.8×10^{-6} m/sec. ($h = 6.626 \times 10^{-34}$ J S and $m = 8.2 \times 10^{-34}$ kg.) (03)

Que.2 Answer the following questions. (10)

(A) Discuss the comparison between Inductive effect & Mesomeric effect. (05)

(B) (i) Explain three methods of formation of Carbenes. (03)

(ii) Define: Homolytic fission & Heterolytic fission. (02)

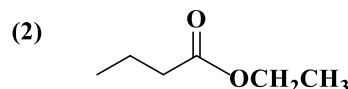
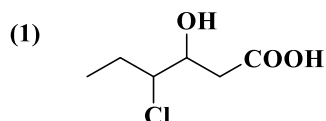
OR

Que.2 Answer the following questions. (10)

(A) What is Hyperconjugation? Explain with suitable examples. (05)

(B) (i) Explain three different methods of formation of Free radicals. (03)

(ii) Give IUPAC name of following structures. (02)



Que.3 Answer the following questions. (10)

(A) Give any five differences between Physisorption & Chemisorption. (05)

(B) Explain Homogeneous catalysis with suitable examples. (05)

OR

Que.3 Answer the following questions. (10)

(A) Explain Heterogeneous catalysis with suitable examples. (05)

(B) (i) Calculate the Normality of aqueous solution if 5.3 g of Na_2CO_3 is dissolved in 250 ml of solution. (Mol. wt. of $\text{Na}_2\text{CO}_3 = 106$ g/mol) (03)

(ii) Give definition of Molarity and Molality. (02)

Que.4 Answer the following questions. (10)

(A) Write a note on Metallic radius & Vander Waal's radius in detail. (05)

(B) (i) What is Addition reaction? Give three examples of it. (03)

(ii) Calculate the Molarity of aqueous solution if 49 g of H_2SO_4 is dissolved in 1500 ml of solution. (Mol. wt. of $\text{H}_2\text{SO}_4 = 98$ g/mol) (02)

OR

- Que.4 Answer the following questions. (10)
(A) Discuss: Stability of Carbocations in detail. (05)
(B) (i) Give definition of Ionisation potential & Electronegativity. (02)
(ii) What is Auto-catalysis? Give two examples of it. (03)
- Que.5 Answer the following questions. (10)
(A) Write a note on Stability of Carbanions in detail. (05)
(B) (i) Define: Adsorption, Adsorbent and Absorption. (03)
(ii) Explain: Azimuthal quantum number. (02)

OR

- Que.5 Answer the following questions. (10)
(A) Write a note on Freundlich adsorption isotherm in detail. (05)
(B) (i) What is Inductive effect? List any six functional group having –I effect. (02)
(ii) Write a note on Pauli's exclusion principle with proper explanation. (03)
