

B.Sc. Semester - 2 (NEP-2020) Examination

JUNE – 2024

CHE: Foundation in Chemistry (Major-4)

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) Give the synthesis, properties & structure of borax.

(B) Explain: Borax bead test.

OR

Que.1 Answer the following questions:

(A) What is oxide? Classify oxides based on their oxygen content.

(B) PbCl_2 has $K_{sp} = 1.7 \times 10^{-5}$. If equal volume of 0.02M $\text{Pb}(\text{NO}_3)_2$ and 0.02M KCl are mixed, comment whether precipitation occurs or not.

Que.2 Answer the following questions: (10)

(A) Explain: Bayers strain theory with examples.

(B) What is aromaticity? Explain Huckles rule with its criteria and examples.

OR

Que.2 Answer the following questions:

(A) Give the reaction, mechanism & examples of Friedel Crafts alkylation.

(B) Explain various conformations of Butane with energy profile diagram.

Que.3 Answer the following questions: (10)

(A) Derive Bragg's equation for X-ray Crystallography.

(B) Give any five differences between amorphous and crystalline solids.

OR

Que.3 Answer the following questions:

(A) Draw the SCP, BCC, FCC and ECC and calculate atoms/unit cell of each.

(B) Discuss the crystal structure of NaCl by Crystallography.

Que.4 Answer the following questions: (10)

(A) Match the following pair:

Oxide		Oxydation State of Nitrogen	
1	N_2O_3	a	+2
2	N_2O	b	+3
3	NO_2	c	+4
4	N_2O_5	d	+5
5	NO	e	-2
		f	+1

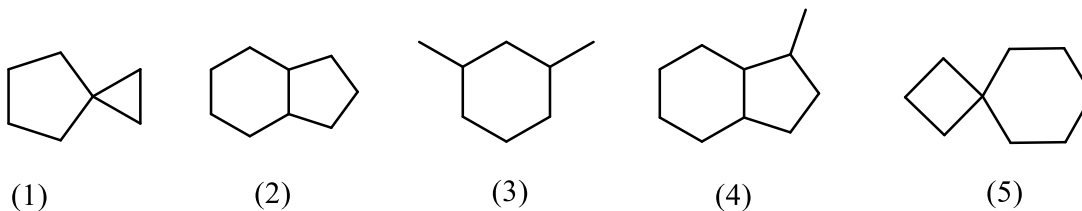
(B) Give two examples of each aromatic, non-aromatic and antiaromatic compounds with structure.

OR

Que.4 Answer the following questions:

(A) Why excess of NH_4OH is required to precipitate out the sulphides of group IIIB cations?

(B) Give the IUPAC nomenclature of following molecules:



Que.5 Answer the following questions:

(10)

(A) Calculate the density for A metal which has FCC lattice with the edge length of 450 pm. [Molar mass of the metal is 50 g mol^{-1}]

(B) Give the method of preparation of small ring cycloalkanes.

OR

Que.5 Answer the following questions:

(A) Nickel crystallizes in a FCC structure. If its density is 8.9 g cm^{-3} , then calculate the edge length (in $\text{\AA}$) of the unit cell. (Mw of Ni = 59 g/mol)

(B) Give the nitration reactions of benzene with full mechanisms.
