

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

MARCH/APRIL-2025

CHE: Foundation in Chemistry (Major-4)

Time: 2 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 structure of Borax, Boric acid, Boron nitrides, Borohydrides (diborane), Boron halide
- (B) Explain: Borax bead test.

OR**Que.1 Answer the following questions:**

- (A) What is oxide? Classify oxides based on their chemical behaviour.
- (B) Ag_2CrO_4 has $K_{sp}=1.9 \times 10^{-12}$. If equal volume of 0.04M AgNO_3 and 0.04M K_2CrO_4 are mixed, comment whether precipitation occurs or not.

Que.2 Answer the following questions: (10)

- (A) Explain conformations of Butane with Energy profile diagram.
- (B) Explain Intra-molecular Wurtz' reaction, Simmons-Smith, Diels-Alder reaction.

OR**Que.2 Answer the following questions:**

- (A) Give the reaction mechanism & examples of sulphonation reaction.
- (B) What is Aromaticity? Explain Huckes rule with its criteria and examples.

Que.3 Answer the following questions: (10)

- (A) Derive Brags equation for Xray Crystallography.
- (B) Give any five differences between amorphous and crystalline solids.

OR**Que.3 Answer the following questions:**

- (A) Calculate the numbers of atoms per unit cell in SCP, BCC, FCC and ECC lattice.
- (B) Discuss the crystal structure of KCl by Crystallography.

Que.4 Answer the following questions: (10)

- (A) Match the following pair:

Oxide		Chemical behaviour of Oxied.	
1	N_2O	A	Neutral
2	Al_2O_3	B	Acidic
3	CO_2	C	Basic
4	MgO	D	Amphoteric
5	KO_2	E	Peroxide
6	Na_2O_2	F	Superoxide

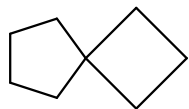
- (B) Give two examples of each aromatic, non-aromatic and antiaromatic compounds with structure.

OR

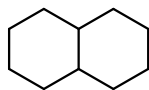
Que.4 Answer the following questions:

(A) Explain chemistry with reactions of Dry test for negative radicals Br^- , CO_3^{2-} , SO_4^{2-} , NO_2^- , I^- ?

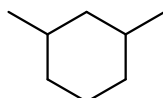
(B) Give the IUPAC nomenclature of following molecules:



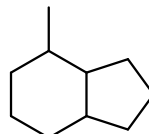
(1)



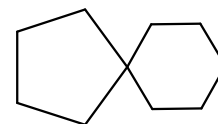
(2)



(3)



(4)



(5)

Que.5 Answer the following questions:

(10)

(A) A compound formed by elements X and Y crystallizes in the cubic structure when Y atoms are at the corners of the cube and X atoms are at alternate faces. What is the formula of compound?

(B) Explain Bayers strain theory with examples.

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) Justify: Chlorine is Ortho Para directing for electrophilic substitution reaction despite of its electron withdrawing nature.
