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S. No. of Question Paper : 5897

Unique Paper Code : 2173552001

Name of the Paper : DSE : Main Group Chemistry

Name of the Course : Bachelor of Science in Industrial Chemistry

Semester : IV/VI

Duration : 2 Hours

Maximum Marks : 60

(Write your Roll No. on the top immediately on receipt of this question paper.)

Attempt any *four* out of six questions.

All questions carry equal marks.

1. (i) What is Ellingham diagram ? CO is a better reducing agent than carbon below 710°C but above this temperature reverse is true. Justify.
(ii) Discuss the cyanide process for the purification of silver metal.
(iii) Why sulphites are good reducing agents ? 5,5,5
2. (i) What is Dibenzo 18-crown-6 ? Name the alkali metal which will form the most stable complex with this molecule and draw the structure of complex.

P.T.O.

- (ii) Melting point and Boiling point of group 13 elements decreases on moving down the group from boron to thallium. Boiling point of gallium is in the line with others but melting point is not. Give reason.
- (iii) Why and in what ways does Lithium show anomalous behaviour than rest of the elements of group 1 ? 5,5,5
3. (i) Why the alkali metals are soft and have low melting and boiling points ? On moving down from lithium to caesium how these varies ?
- (ii) What is hydroboration oxidation reaction ? Explain this using diborane and 1-propene.
- (iii) What are silicates ? Classify them and explain cyclic silicates. 5,5,5
4. (i) What are silicone fluids ? How are they prepared ? Give specific uses.
- (ii) Explain the structures of hydrides of group 15. Why the bond angle decreases on moving from nitrogen to antimony hydrides ?
- (iii) Draw the structures/shapes of SO_2 , SO_3 , PCl_5 , N_2O , PCl_3 . 5,5,5
5. (i) Arrange the following acids in decreasing order of acidic strength. Justify the answer :
- (a) HClO_3 , HClO , HClO_4 , HClO_2
- (b) H_3PO_4 , H_3PO_2 , H_3PO_3 .

(ii) Draw and compare the structures of SO_4^{2-} and $\text{S}_2\text{O}_3^{2-}$ ions. Give the different oxidation states of "S" involved in these ions.

(iii) Why excessive use of phosphates as water softener is criticized by the environmentalist ?

5,5,5

6. Write short notes on the following :

(i) Zone Refining

(ii) Van Arkel de Boer Process.

(iii) H_2S gas.

5,5,5