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3 (Sem-3/CBCS) CHE HC 1

2023

CHEMISTRY

(Honours Core)

Paper : CHE-HC-3016

(Inorganic Chemistry-II)

Full Marks : 60

Time : Three hours

The figures in the margin indicate full marks for the questions.

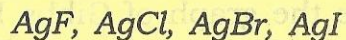
1. Answer the following as directed: 1×7=7
 - (a) Name the graph of Gibbs Energy (ΔG) versus Temperature (T) for the formation of oxide of metal.
 - (b) "Group-I elements gets oxidized easily" – State whether *True* or *False*.
 - (c) Write the structural formula of borazine.
 - (d) What is "basicity of an acid"?

Contd.

- (e) Which one of the following species is conjugate base of OH^- ?
- H_2O
 - O^{2-}
 - O_2
 - O_2^{2-}
- (f) "The name inert gas is improper" – Explain the statement.
- (g) Calculate the hardness of Al^{3+} for the ionization energy, 119.99 eV and electron affinity 28.45 eV.

2. Answer the following : $2 \times 4 = 8$

- Describe the structure of boric acid.
- What is inert pair effect? Arrange the stability of +1 oxidation states of Ca^+ , Al^+ , In^+ and Tl^+ in their increasing order.
- Applying Wade's rule, predict and draw the structure of CB_5H_9 .
- Arrange the following compounds in ascending order of their solubility in water.



Give explanation.

3. Answer **any three** of the following :

$5 \times 3 = 15$

- Briefly discuss the bonding and structure of diborane. 5

(b) What is diagonal relationship? Write **any four** similar properties of Be and Al . 1+4=5

(c) Discuss the Mond's process used in metal refining.

(d) What are polyhalides? Give example. How they are different from Interhalogen Compounds? 1+1+3=5

(e) Write constructing properties of the borazine and benzene.

4. Answer **any three** of the following :

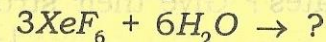
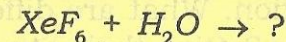
$10 \times 3 = 30$

(a) What is Allotropism? Name Different allotropes of carbon. Discuss bonding in graphite. Explain the high thermal and electrical conductivity of graphite. What is intercalation compounds? Give examples. 2+2+2+2+1+1=10

(b) (i) What happens when Xenon is heated in presence of flourine? How the amount of flourine affect the nature of product? 2+2=4

(ii) Discuss the bonding in XeF_6 . 4

(iii) Complete the following reaction



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(c) (i) Give the formula, structure and method of preparation of basic beryllium acetate. 1+2+2=5

(ii) How are poly siloxanes formed? Distinguish between silicon fluids and silicon rubbers. 2+3=5

(d) Write notes on : **(any two)** 5+5=10

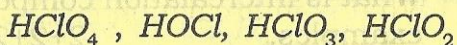
(i) Pseudohalogens

(ii) Pasting process

(iii) Catenation

(e) (i) State the Pauling's rules for determination of strength of mononuclear oxoacids. 3

(ii) Arrange the following in order of descending acid strengths in aqueous solution -



Give explanation. 3

(iii) Pauling's rule is useful in detecting structural anomalies, explain. 2

(iv) What is symbiosis? Explain. 2

(f) What is silicates? Explain the bonding and structure of SiO_4^{4-} unit using hybridization. What are different types of silicates? Give their structure.

1+4+3+2=10