

3 SEM TDC CHMH (CBCS) C 5

2023

(Nov/Dec)

CHEMISTRY

(Core)

Paper : C-5

(Inorganic Chemistry)

Full Marks : 53

Pass Marks : 21

Time : 3 hours

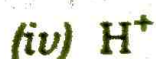
*The figures in the margin indicate full marks
for the questions*

1. Choose the correct answer from the following alternatives : 1×6=6

(a) Metals generally occur in their native state in nature have

- (i) positive standard electrode potentials
- (ii) high affinity to oxygen
- (iii) incompletely filled *d*-orbitals
- (iv) negative standard electrode potentials

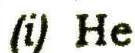
(b) Which of the following is a soft acid?



(c) Which of the following pairs is not an example of diagonal relationship?



(d) The noble gas most difficult to liquify is



(e) The structure of $(\text{NPCl}_2)_4$ is

- (i) tetrahedral
- (ii) tub-like
- (iii) planar
- (iv) pyramidal

(f) The shape of XeO_3 molecule is

- (i) triangular planar
- (ii) pyramidal
- (iii) tetrahedral
- (iv) octahedral

2. Write short notes on the following (any two) :

2×2=4

- (a) Mond's process of refining
- (b) Zone refining
- (c) Parting process

3. Answer the following questions (any two) : $3 \times 2 = 6$

(a) What are Lewis bases? Classify different types of Lewis bases with examples. $1+2=3$

(b) Explain HSAB principle with suitable example. Using this principle, predict whether the following reaction is feasible or not : $2+1=3$



(c) What is inert pair effect? Why does the inert pair effect increase down the group? $1\frac{1}{2}+1\frac{1}{2}=3$

4. Answer the following questions (any five) : $2 \times 5 = 10$

(a) Which one of the following is more acidic and why? $1+1=2$



(b) H_3PO_2 is a good reducing agent. Why? 2

- (c) Draw the electronic structure of H_3PO_4 and N_2O_4 . 1+1=2
- (d) Lithium has dissimilarities with other alkali metals. Why? 2
- (e) HCO_3^- ion behaves as an amphoteric substance. Why? 2
- (f) What is the general repeating unit in silicones? State a unique character of silicones. 1+1=2

5. Answer the following questions (any five) :

3×5=15

- (a) Give one method of preparation of diborane. Explain the formation of (3c—2e) bond in diborane. 1+2=3
- (b) Write one method of preparation and structure of boron nitrides. 1+2=3
- (c) Discuss the structural difference of diamond and graphite. 3

(d) What is catenation? The catenation property is more significant in carbon than other elements. Why? $1+2=3$

(e) Explain why—

(i) halogens exhibit +1, +3, +5 and +7 oxidation states;

(ii) reaction between iron and HCl produces FeCl_2 not FeCl_3 . $1\frac{1}{2}+1\frac{1}{2}=3$

(f) Write a note on main allotropic forms of sulphur. 3

6. Answer the following questions (any two) : $3 \times 2 = 6$

(a) Explain the structures of XeF_4 and XeOF_4 . $1\frac{1}{2}+1\frac{1}{2}=3$

(b) Give one method of preparation and one chemical property of XeF_2 . $1\frac{1}{2}+1\frac{1}{2}=3$

(c) (i) No chemical compound of He is known. Explain. $1\frac{1}{2}$

(ii) What are clathrates? Give example. $1+\frac{1}{2}=1\frac{1}{2}$

7. Answer the following questions (any two) : $3 \times 2 = 6$

(a) What are linear and cyclic silicones?
Give example of each. $1\frac{1}{2} + 1\frac{1}{2} = 3$

(b) What is inorganic benzene? Why is it
called inorganic benzene? $1 + 2 = 3$

(c) What are silicones? Mention two
applications of silicones. $2 + 1 = 3$

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