REV-01
BSC/01/05

2024/11

SET A

B.Sc. CHEMISTRY
THIRD SEMESTER
INORGANIC CHEMISTRY II
BSC – 301 [OLD COURSE] [REPEAT]
[USE OMR FOR OBJECTIVE PART]

Duration : 3 hrs. **Full Marks : 70**

(Objective)

Time : 30 min. **Marks : 20**

Choose the correct answer from the following: ***1×20=20***

1. The relative order of acidity of oxy-acid with respect to oxidation state is -
   a. $HClO_4 > HClO_3 > HClO_2 > HClO$
   b. $HClO_4 < HClO_3 > HClO_2 > HClO$
   c. $HClO_4 > HClO_3 > HClO_2 < HClO$
   d. $HClO_4 < HClO_3 < HClO_2 < HClO$

2. Li^+-ion is a
   a. Soft base
   b. Hard base
   c. Soft acid
   d. Hard acid

3. Acid strength of the following Chloro acetic acid is -
   a. $ClCH_2COOH > Cl_2CHCOOH > Cl_3CCOOH$
   b. $ClCH_2COOH < Cl_2CHCOOH < Cl_3CCOOH$
   c. $ClCH_2COOH < Cl_2CHCOOH > Cl_3CCOOH$
   d. $ClCH_2COOH = Cl_2CHCOOH > Cl_3CCOOH$

4. Structure of cyclic trimeric phosphazene $[NPCl_2]_3$is
   a. Octahedral
   b. Hexagonal
   c. Hexagonal plane
   d. Tetrahedral

5. Like carbon the Boron nitride (BN)n can exist as
   a. Graphite
   b. Diamond
   c. Graphite and Diamond
   d. Amorphous state

6. N_2O (laughing gas) finds use in the following except
   a. As fuel for rockets
   b. As an anaesthetic
   c. For the preparation of N_3H
   d. As a propellant for whipped ice-cream

7. Which of the following oxides of nitrogen is paramagnetic?
   a. N_2O
   b. NO_2
   c. N_2O_3
   d. N_2O_5

8. The interhalogen compound not obtained is
   a. ICl
   b. IF_5
   c. BrF_5
   d. $BrCl_7$

9. Following is (are) allotropes of carbon
   a. Diamond
   b. Fullerene
   c. Graphene
   d. All of the above

10. Boric acid is
    a. Tri basic acid
    b. Weak monobasic acid
    c. Strong acid
    d. None of the above

11. The active metals are
    a. Reluctant to get oxidised
    b. Reluctant to get reduced
    c. Eager to get reduced
    d. None of the above

12. Smelting is
    a. Oxidation
    b. Reduction
    c. Thermit process
    d. None of the above

13. The process in which the metal is obtained by simply heating the sulphide ore is called
    a. Smelting
    b. Roasting
    c. Pyrometallurgical process
    d. None of the above

14. Pyrometallurgical process refers to
    a. Hydrolysis of a metal ore
    b. Heating oxide of metal with coke
    c. Ionisation in water
    d. None of the above

15. In Goldschmidt Thermit Process, the metal used for reducing the oxide of another metal is
    a. Cr
    b. Mn
    c. Al
    d. Fe

16. The reaction of solid XeF_2 with AsF_5 in 1:1 ratio affords
    a. XeF_4 and AsF_3
    b. XeF_6 and AsF_3
    c. $[XeF]^+[AsF_6]^-$
    d. $[Xe_2F_3]^+[AsF_6]^-$

17. The hybridization of XeF_2 molecule is
    a. Sp^3d
    b. d^2sp^3
    c. Sp^3
    d. Sp^2

18. The geometry of $XeOF_4$ molecule is
    a. Square pyramidal
    b. Tetrahedral
    c. Octahedral
    d. Linear

19. When XeF_6 undergoes slow hydrolysis with atmospheric moisture gives
    a. XeO_3
    b. Xe
    c. XeF2
    d. None of the above

20. The oxidation state of Xe in XeO_3F_2
    a. +8
    b. +6
    c. +2
    d. +4

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Descriptive

Time : 2 hrs. 30 min. **Marks : 50**

[Answer question no.1 & any four (4) from the rest]

1. **a.** Suggest a preparation of Borazine. **2+2+3**
   b. Write the preparation of XeF_2. **+3=10**
   c. What is Zone Refining? How is impure metal purified by this process?
   d. Discuss the anomalous behaviour of first member of each group of "s & p block elements".

2. Explain in details the different types of Silicate in nature, their structure and application of some of these silicates. **10**

3. **a.** Explain the Bronsted –Lowry concept of acid and base. **5+5=10**
   b. Explain factors that determine the variation of Lewis acid strength.

4. **a.** What is meant by Parting Process? How is it carried out with sulphuric acid? **2+4=6**
   b. How is nickel extracted by Mond's Process? **4**

5. **a.** How is Zirconium ultrapurified by van Arkel –de-Boer Process? **5**
   b. How is silver extracted by Hydrometallurgical Process? **5**

6. **a.** Discuss the structure and bonding of Diborane. **2+2=4**
   b. WhyBorazine is also known as inorganic benzene. **3**
   c. Give preparation and uses of boric acid. **3**

7. **a.** What are the oxides of nitrogen? Show the oxidation state of nitrogen and the structure of various oxides of nitrogen. **2**
   b. Give two preparation and two properties of silanes. **2**
   c. Explain the properties and structure of XeF_2. **3**
   d. Write the preparation properties and structure of XeO_3. **3**

8. **a.** Write the preparation, properties and structure of XeF_4. **5+5=10**
   b. Discuss the preparation, properties and structure of XeF_6.

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