C 20093 (Pages : 3) Name.....

Reg. No.....

SIXTH SEMESTER (CUCBCSS—UG) DEGREE EXAMINATION MARCH 2022

Chemistry

CHE 6B 09—INORGANIC CHEMISTRY—IV

(2014 to 2018 Admissions)

Time : Three Hours Maximum : 80 Marks

Section A (One Words)

Answer **all** *questions.*

Each question carries 1 *mark.*

1. The constituents of German silver are ————.
2. Actinides are characterized by filling up of ———— orbitals.
3. The element with highest density is ————.
4. Titanium is purified by ———— method.
5. The geometry of $[Ni(CO)_4]$ is ————.
6. Give an example of tridentate ligand.
7. The complex $[Co(NH_3)_6]^{3+}$ is a ———— spin complex.
8. Give an example for a trace metal in biological system.
9. What is Wilkinson's catalyst ?
10. Give the structure of cisplatin.

(10 × 1 = 10 marks)

Section B (Short Answers)

Answer any **ten** *questions.*

Each question carries 2 *marks.*

11. Explain Van Arkel method.
12. Give the uses of alloy steels.

Turn over

13. How do you account for closeness of atomic radii of zirconium and hafnium ?

14. The compounds of *s* and *p* block element are generally colourless, whereas that of transition elements are coloured. Explain.

15. Briefly describe ionization isomerism in co-ordination compounds.

16. Give the structure and significance of carboplatin.

17. Differentiate inert and labile complexes.

18. Briefly describe the structure of $[Co_2(CO)_8]$.

19. Explain Chelate effect.

20. Explain the toxicity of mercury.

21. Briefly describe Ellingham diagram for metal oxides.

22. Why is a solution of copper(ll)sulphate blue ?

(10 × 2 = 20 marks)

Section C (Paragraph)

Answer any **five** *questions.*

Each question carries 6 *marks.*

23. Give a comparison of lanthanides and actinides.

24. Write a note on spectrochemical series.

25. Briefly describe Mond's process.

26. Describe the structure of ferrocene.

27. Explain the biochemistry of calcium.

28. Discuss the factors influencing the extent of crystal field splitting.

29. Describe the open-hearth process.

30. Briefly describe the toxicity of lead and arsenic.

(5 × 6 = 30 marks)

Section D (Essay)

Answer any **two** *questions.*

Each question carries 10 *questions.*

31. Write a note on isomerism in co-ordination compounds.

32. (a) Describe the isolation of lanthanides from monazite.

    (b) Explain the separation of lanthanides using ion-exchange resin.

33. Describe the metallurgy of iron.

34. (a) Discuss the mechanism of sodium-potassium pump.

    (b) Biochemistry of zinc.

(2 × 10 = 20 marks)

C 20539 **(Pages : 2)** **Name.....**

Reg. No.....

SIXTH SEMESTER U.G. DEGREE EXAMINATION, MARCH 2022

(CBCSS–UG)

Chemistry

CHE 6B 09—INORGANIC CHEMISTRY—IV

(2019 Admissions)

Time : Two Hours Maximum : 60 Marks

Section A

Answer atleast **eight** *questions.*
Each question carries 3 *marks.*
All questions can be attended.
Overall ceiling 30.

1. What is AAS ?
2. Discuss the principle of FES.
3. La(OH)3 is more basic than Lu(OH)3. Why ?
4. Copper is a transition element. Predict its four important properties.
5. What are d block elements ? Give their electronic configuration.
6. What is meant by stability constant ?
7. What is spectrochemical series ?
8. While $Co[(H_2O)_6]^{2+}$ is pink in colour, $Co(Cl)_4]^{2-}$ is blue in colour. Why ?
9. What is Zeise's salt ? Write its structure.
10. What is Wilkinson's catalyst ? Write its structure.
11. How does Haemoglobin differ from myoglobin ?
12. Why Arsenic is considered as a toxic metal?

(8 × 3 = 24 marks)

Turn over

Section B

Answer atleast **five** *questions.*
Each question carries 5 *marks.*
All questions can be attended.
Overall ceiling 25.

13. What are the factors affecting DTA curves ?

14. What are actinides ? Why are they so called ?

15. Discuss the paramagnetic behaviour of *d* and *f* block elements.

16. What is lanthanide contraction ? What are its consequences ?

17. Cobalt (III) easily forms low spin complexes whereas Cobalt (II) does not. Explain.

18. Discuss any *five* factors influencing the stability of complexes.

19. Give an account of the bio-chemistry and significance of Zinc in living systems.

(5 × 5 = 25 marks)

Section C

Answer any **one** *questions.*
Each question carries 11 *marks.*

20. (a) Describe the ion exchange method for the separation of lanthanides from monazite.

    (b) Comment on the industrial importance of Lanthanides.

21. Write an account on the Molecular orbital theory of octahedral complexes containing only sigma bonds.

(1 × 11 = 11 marks)

C 40514 (Pages : 2) Name.....

Reg. No.....

SIXTH SEMESTER U.G. DEGREE EXAMINATION MARCH 2023

(CBCSS—UG)

Chemistry/Polymer Chemistry

CHE 6B 09—INORGANIC CHEMISTRY—IV

(2019 Admission onwards)

Time : Two Hours Maximum : 60 Marks

Section A (Short Answers)

Answer **all** *questions.*

Each question carries 2 *mark.*

Ceiling 20.

1. What is the difference between DTA and DSC ?
2. What is the use of thermogravimetric analysis ?
3. Cupric salts are coloured while cuprous salts are colourless. Give reason.
4. Write the formula for spin only magnetic moment of transition ions based on number of unpaired electrons.
5. Why is the increase in the first ionization energy of transition elements not vary regularly with an increase in atomic number ?
6. What is the difference between labile and inert complexes ?
7. What is spectrochemical series ?
8. While $Co[(H_2O)_6]^{2+}$ is pink in colour, $Co\ (Cl)_4]^{2-}$ is blue in colour. Why ?
9. Draw the shapes of $Fe\ (CO)_5$ and $Ni\ (CO)_4$.
10. What is Zeise's salt? Write its structure.
11. Write a note on effect of mercury on living body.
12. How does Hemoglobin differ from myoglobin ?

(Ceiling of marks : 20)

Turn over

Section B (Paragraph)

Answer **all** *questions.*

Each question carries 5 *marks.*

Ceiling 30.

13. Differentiate between SEM and TEM.
14. Why do lanthanoids form coloured complexes ?
15. What is lanthanide contraction ? What are its consequences ?
16. What are actinides ? Why are they so called ?
17. Cobalt (III) easily forms low spin complexes whereas Cobalt (II) does not. Explain.
18. Give an account of the classification of organometallic compounds by nature of bonding.
19. Give an account of the biological significance of Cobalt in living systems

(Ceiling of marks : 30)

Section C (Essay)

Answer any **one** *questions.*

The question carries 10 *marks.*

20. (a) Describe briefly the general characteristics of the f block elements in the periodic table with emphasis on their electronic configuration,

    (b) Comment on the industrial importance of Lanthanides.

    Any 10 *points full mark.*

21. (a) Write in detail the preparation and properties of Ferrocene.

    (b) Discuss the nature of bonding in metal carbonyls.

(1 × 10 = 10 marks)

D 100523 (Pages : 2) Name.....

Reg. No.....

SIXTH SEMESTER U.G. (CBCSS—UG) DEGREE EXAMINATION MARCH 2024

Chemistry/Polymer Chemistry

CHE 6B 09—INORGANIC CHEMISTRY—IV

(2019 Admission onwards)

Time : Two Hours Maximum : 60 Marks

Section A (Short Answers)

Answer questions up to 20 *marks.*

Each question carries 2 *marks.*

1. Give one example each for reference electrode, working electrode and counter electrode of cyclic voltammetry.
2. Give any *two* radiation source in AFM.
3. Explain why does colour of $KMnO_4$, disappear when oxalic acid is added to its solution in acidic medium.
4. Why $[Fe(CN)_6]^{3-}$ is weakly paramagnetic while $[Fe(CN)_6]^{4-}$ is diamagnetic ?
5. Arrange the following complexes in the increasing order of conductivity of their solution : $[Co(NH_3)_3Cl_3]$, $[Co(NH_3)_4Cl_2]$ Cl, $[Co(NH_3)_6]Cl_3$, $[Cr(NH_3)_5Cl]$ Cl_2.
6. Why are low spin tetrahedral complexes not formed ?
7. Calculate CFSE of low spin and high spin d^6 metal complexes of octahedral geometry in terms of Δo.
8. Classify the organometallic compounds based on the nature of metal ligand bond with one example each.
9. Arrange the following ligands in the increasing order of field strength H_2O, Cl^-, CO and NH_3.
10. Illustrate 18-electron rule taking ferrocene as example.
11. Draw the structure of $Fe_2(CO)_9$.
12. Explain any *two* biological role of Calcium in human body.

(Ceiling of marks: 20)

Turn over

Section B (Paragraph)

Answer questions up to 30 *marks.*
Each question carries 5 *marks.*

13. Draw the TGA of $CuSO_4$ $5H_2O$ and explain.

14. List out the different detectors used in AAS and its working principles.

15. Explain the metallic properties of transition metal based on the band theory.

16. Discuss the different factors affecting crystal field splitting.

17. Explain the hydrogenation of alkene by using Wilkinson catalyst.

18. Briefly explain the structure and bonding in Zeise's salt.

19. Illustrate inner orbital and outer orbital complexes.

(Ceiling of marks : 30)

Section C (Essay)

Answer any **one** *question.*
The question carries 10 *marks.*

20. (a) Discuss the importance of beach sands in Kerala.

    (b) Explain the Jahn Teller distortion of octahedral complex.

21. Explain the following :

    (a) Sodium potassium pump.

    (b) Structure and significance of carboplatin and auranofin.

(1 × 10 = 10 marks)