

**2024/FYUG/ODD/SEM/
CHMDSC-201T/189**

FYUG Odd Semester Exam., 2024

CHEMISTRY

(3rd Semester)

Course No. : CHMDSC-201T

(Inorganic Chemistry—II)

Full Marks : 70

Pass Marks : 28

Time : 3 hours

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

UNIT—I

1. Answer any *two* from the following : 2×2=4

- (a) What are pseudohalogens? How do they differ from interhalogen compound? 1+1=2
- (b) Define diagonal relationship in periodic table with suitable examples.
- (c) What are meant by catenation and allotropy? 1+1=2

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(2)

2. (a) Discuss the postulates of VSEPR theory. What are clathrate compounds? 3+1=4
- (b) Discuss the preparation of XeF_2 , XeF_4 , XeF_6 . 3
- (c) How are hydrides classified? Explain with examples. 3

OR

3. (a) Describe the structures of XeF_6 , IF_7 , SF_6 and H_2O using VSEPR theory. 4
- (b) Draw the structure of boric acid. Write one method of its preparation. Mention its uses. 3
- (c) Discuss the structure and bonding in diborane. 3

UNIT—II

4. Answer any two from the following : 2×2=4
- (a) What is meant by levelling effect of solvents?
- (b) Mention two applications of silicates.
- (c) Write the conjugate acids and bases of HSO_4^- and NH_3 .

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(3)

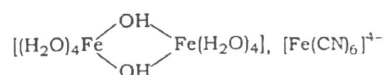
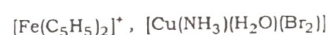
5. (a) Discuss Brønsted-Lowry concept of acids and bases classification. 3
- (b) What are soft and hard acids and bases? Mention few applications of HSAB principle. 4
- (c) What is silicone rubber? Write few applications of silicone rubber. 3

OR

6. (a) How is borazine prepared? Discuss its structure. Explain its resemblance with benzene. 5
- (b) Write one method of preparation of silicones and siloxanes. 3
- (c) Discuss the classification of Lewis acids with examples. 2

UNIT—III

7. Answer any two from the following : 2×2=4
- (a) Explain linkage isomerism with examples.
- (b) State Werner's theory of coordination compounds.
- (c) Write IUPAC names of the following :



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(4)

8. (a) Discuss crystal field theory of octahedral complexes. 5
(b) Calculate CFSE of—
(i) high spin d^6 ;
(ii) low spin d^7 ;
(iii) high spin d^4 . 3
(c) What is chelate effect? Give example. 2

OR

9. (a) Discuss in brief about Jahn-Teller distortion. 5
(b) What are meant by labile and inert complexes? 3
(c) Discuss the back bonding in coordination complexes with suitable example. 2

UNIT—IV

10. Answer any two from the following : $2 \times 2 = 4$
(a) Write the general electronic configurations of Cr and Cu. $1 + 1 = 2$
(b) What is meant by lanthanide contraction?
(c) Why do transition elements form coloured compounds?

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(5)

11. (a) Why do transition metals show variable valency? Describe the catalytic properties of transition elements. $2 + 2 = 4$
(b) Discuss two similarities and differences between lanthanoids and actinoids. 3
(c) Why does $3d^4$ configuration of Cr^{3+} act as a reducing agent but Mn^{3+} act as an oxidising agent? 3

OR

12. (a) Discuss separation of lanthanoids via ion-exchange method. 5
(b) Write a short note on oxidation states of lanthanoids. 3
(c) Why are Zn^{2+} salts colourless but Ni^{2+} salts coloured? 2

UNIT—V

13. Answer any two from the following : $2 \times 2 = 4$
(a) What is the disease caused by Ca and Mg deficiency in body?
(b) Which metal is present in (i) porphyrin ring of blood and (ii) vitamin B_{12} ? $1 + 1 = 2$
(c) What are trace elements? Mention one transition metal complex used to treat cancer. $1 + 1 = 2$

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(6)

14. (a) How does arsenic toxicity affect human health? Mention one method of removal of arsenic contamination. 5

(b) Discuss the role of Zn and Co in biological system. 5

OR

15. (a) Describe the concept of deficiency and toxicity of different trace elements in human body. 5

(b) Write the role of chelating agents in medicine. 2

(c) What are the diseases caused by lead poisoning? How are they treated? 3

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