

2023/TDC(CBCS)/ODD/SEM/
CHMHCC-101T/258

TDC (CBCS) Odd Semester Exam., 2023

CHEMISTRY

(Honours)

(1st Semester)

Course No. : CHMHCC-101T

(Inorganic Chemistry)

Full Marks : 50

Pass Marks : 20

Time : 3 hours

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

SECTION—A

Answer ten questions, taking any two from each

Unit :

2×10=20

UNIT—I

1. Mention two important postulates of Bohr theory.
2. Derive the equation $mvr = n \frac{h}{2\pi}$ considering de Broglie's concept.
3. How many orbitals are possible for fourth main shell?

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UNIT—II

4. Calculate Z_{eff} for Cl^- ion.
5. Discuss sp^3d^2 hybridization with suitable example.
6. Compare the electron affinity of chlorine and fluorine.

UNIT—III

7. Draw the Born-Haber cycle with a suitable example.
8. Discuss the structure of XeF_2 .
9. Bond angles of CH_4 and H_2O are different. Explain.

UNIT—IV

10. Which of the following is more covalent and why?



11. Explain how dipole moment values can be used in calculating the percentage of ionic character in a compound.
12. What do you mean by intermolecular and intramolecular H-bonding?

(3)

UNIT—V

13. Arrange the following in the increasing oxidation number of carbon :



14. Write down the Nernst equation for galvanic cell.

15. Define electrochemical series.

SECTION—B

Answer *five* questions, taking *one* from each Unit :

6×5=30

UNIT—I

16. (a) Find an expression for energy of an electron present in first shell of H-atom. 3

(b) State and explain Aufbau principle with example. 3

17. (a) State and explain Heisenberg uncertainty principle. Mention its significance. 3

(b) What do you mean by eigenfunction and eigenvalues? 3

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UNIT—II

18. (a) Considering suitable example, calculate the Z_{eff} of 3d electron in first transition series. 3
- (b) Define ionization energy. What are the factors on which ionization energy depends? 3
19. (a) Define covalent radius and van der Waals' radius. Compare with suitable example. 3
- (b) Define electronegativity. Distinguish between electron affinity and electronegativity. 3

UNIT—III

20. (a) Draw the MO diagram of nitrogen molecule. Comment on its magnetic property. 3
- (b) What are the different types of two-dimensional packing in crystal? Discuss with diagram. 3
21. (a) Comment on the geometry of XeF_4 and ClF_3 . $1\frac{1}{2} \times 2 = 3$
- (b) Draw the MO diagram of NO molecule. Comment on its bond order. 3

UNIT—IV

22. (a) State and explain Fajan's rule of polarization with suitable examples. 3
(b) Explain Schottky and Frenkel defects in crystal. 3
23. (a) What do you mean by *n*-type and *p*-type semiconductors? Give examples. 3
(b) Discuss the different types of weak chemical forces. 3

UNIT—V

24. (a) Balance the following reaction by ion-electron method : 3
$$\text{Br}_2 + \text{NaOH} \longrightarrow \text{NaBr} + \text{NaBrO}_3 + \text{H}_2\text{O}$$

(b) How much $\text{K}_2\text{Cr}_2\text{O}_7$ is required to prepare 0.1 N 250 solution? 3
25. (a) Discuss the principle and steps involved in the estimation of Fe(II) by KMnO_4 solution. 3
(b) Balance the following reaction by ion-electron method : 3



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