

Reg. No. :

Name :

Third Semester B.Sc. Degree Examination, March 2022.

First Degree Programme under CBCSS

Chemistry

Core Course – II

CH 1341 – INORGANIC CHEMISTRY – II

(2020 Admission)

Time : 3 Hours

Max. Marks : 80

SECTION – A

Answer **all** questions in a word or one or two sentences. Each question carries **1** mark

1. Give the electronic configuration of N_2 molecule.
2. Which is more polar-HF or HI? Justify.
3. Calculate the bond order of N_2^+ .
4. What is the hybridisation and geometry of $XeOF_2$ molecule?
5. Give any two examples for interhalogen compounds.
6. Draw the structure of borazole.
7. Give an example for sheet silicate.
8. State group displacement law.

9. Complete the reaction: ${}_{92}^{235}\text{U} + {}_0^1\text{n} \rightarrow \underline{\hspace{2cm}} ?$

10. What are quantum dots?

(10 × 1 = 10 Marks)

SECTION – B

Answer **any eight** questions. Each question carries **2** marks

11. Differentiate between bonding and antibonding molecular orbitals.
12. Predict the geometry of SF₆ molecule on the basis of VSEPR theory.
13. What is London dispersive forces?
14. What is the partial ionic character of a covalent molecule?
15. Dipole moment of CH₃Cl molecule is a zero value. Why?
16. What is radiation dose?
17. The half-life period of a radionuclide is 4.8 minutes. Calculate its decay constant.
18. What are synthetic elements? Give two examples.
19. Discuss the applications of fullerenes?
20. Write a method for the preparation of TiO₂ nanoparticles
21. What are ultramarines?
22. Explain the formation of *banana bond* in diborane.
23. What are carbon nanotubes?
24. Discuss the structure of boric acid.
25. What are pseudohalides?
26. What are Maddrell's salt?

(8 × 2 = 16 Marks)

SECTION – C

Answer **any six** questions. Each Question carries **4** marks.

27. Distinguish between σ and π -bonds.
28. Explain Born-Haber cycle for NaCl?
29. Predict the structure and hybridization of ClF_3 molecule using VSEPR theory?
30. Write short notes on mass defects and binding energy?
31. Differentiate between nuclear fission and nuclear fusion. Give the applications of each.
32. What are clathrate compounds?
33. Give the classification of boranes based on its structure.
34. Write a note on the manufacturing of glass.
35. Discuss the general properties of inorganic polymers.
36. Write a note on polymeric boron nitride.
37. Give the preparation and structures of xenon oxides.
38. What are *top-down* and *bottom to top* approaches in the preparations of nanomaterials.

(6 × 4 = 24 Marks)

SECTION – D

Answer **any two** questions. Each question carries **15** marks

39. (a) Explain sp^3d hybridisation with suitable example. (4)
(b) What are the salient features of MO theory? (7)
(c) Explain the paramagnetic nature of O_2 ? (4)
40. Briefly describe secondary bond forces and their applications.

41. Write a note on
- (a) Artificial radioactivity (4)
 - (b) Applications of radioactive isotopes in medicine. (4)
 - (c) ^{14}C - dating and rock dating (7)
42. (a) Discuss the properties and applications of silicones.
- (b) What are refractory and covalent carbides. Explain with examples.
43. (a) Explain the structure of interhalogen compounds with suitable examples.
- (b) Discuss the preparation methods for different xenon fluorides.
44. Discuss the properties and applications of nanoparticles.

(2 × 15 = 30 Marks)