

Reg. No. :

Name :

Third Semester B.Sc. Degree Examination, June 2023

First Degree Programme Under CBCSS

Chemistry

Core Course II

CH 1341 : INORGANIC CHEMISTRY II

(2020 Admission Onwards)

Special Examination

Time : 3 Hours

Max. Marks : 80

SECTION – A

Answer **all** questions. **Each** question carries **1** mark.

1. What is Nanotechnology?
2. Which is having the maximum covalent character – LiF or LiI?
3. What are isotopes?
4. What is Nanofabrication?
5. What is the bond order of F_2 molecule?
6. Which noble gas is used in the radiation therapy of cancer?
7. What is rock dating?
8. Arrange the molecules in the increasing order of their lattice energy. NaCl, $MgCl_2$ and $AlCl_3$.

P.T.O.



9. State hybridization of C in C_2H_4 ?

10. Give an example of a boride?

(10 × 1 = 10 Marks)

SECTION – B

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

11. Give two applications of nanomaterials.

12. Explain the sonochemical method of nonmaterial preparation.

13. Write a short note on breeder reactors.

14. What is nuclear fusion? Give an example.

15. What are carboranes?

16. Arrange the given oxoacids of chlorine – $HOCl$, $HClO_2$, $HClO_3$, $HClO_4$ in the increasing order of their acidic strength.

17. The majority of known noble gas compounds are those of xenon. Why?

18. Why helium is preferred over hydrogen to be used in air ships and balloons?

19. Write a short note on dipole-dipole interactions.

20. What is critical mass?

21. What are refractory materials?

22. Of cis and trans 1,2-dichloroethenes, which has zero dipole moment? Why?

23. What is safety glass? What is its advantage?

24. What is the state of hybridization of O in H_3O^+ ion and what is the shape of the molecule?

25. Which has greater bond dissociation energy – O_2 or O_2^+ ? Why?

26. What is meant by polarizing power of a cation?

(8 × 2 = 16 Marks)



SECTION – C

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

27. Write a note on carbon nano tubes.
28. What are nanocomposites?
29. How many alpha and beta particles are emitted in the conversion of $^{237}_{93}\text{Np}$ to $^{209}_{83}\text{Bi}$?
30. Write a note on radioactive disintegration series?
31. What are the salient features of the band theory of metallic bonding?
32. Compare the properties of borazole with benzene.
33. Comment on the similarities between pseudohalogens and halogens.
34. Give the Born-Landé equation and explain the terms.
35. What are Zeolites? Mention one important application of the class.
36. What are the shapes of (i) XeF_4 (ii) XeF_6 (iii) XeOF_4 (iv) XeO_3 ? Also mention the state of hybridization of xenon in the above molecules.
37. Apply the VSEPR theory to predict the shape of XeF_2 molecule.
38. Distinguish between sigma and pi bonds.

(6 × 4 = 24 Marks)

SECTION – D

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

39. (a) Explain the electrical and catalytic properties of nanomaterials. 10
- (b) What are quantum dots? Give an example and an application. 5



40. (a) Explain with examples, how radio isotopes are useful in
- (i) Medical diagnosis. 5+5
 - (ii) Radio therapy 5
- (b) An item of old wooden furniture shows a C-14 activity which is 30% of the activity found in fresh wood. Find the age of the wood that was used to make the object. The half-life of C 14 is 5760 years. 5
41. (a) What are Silicones? How are they classified?
- (b) Write a note on three dimensional silicates.
 - (c) Discuss the properties and applications of polyphosphazenes.
42. (a) Draw the structures of H_3PO_2 , H_3PO_3 and H_3PO_4 . What are their basicities? Explain on the basis of their structures.
- (b) What are interstitial carbides? Discuss their general properties.
 - (c) Explain the general procedure for the manufacture of glass.
43. What is Born-Haber cycle? Discuss with respect to NaCl.
44. (a) Draw the molecular orbital energy diagram for CO molecule. Calculate the bond order and explain its stability and magnetic behaviour. 10
- (b) Explain how the concept of hybridization explains the shape of BFS_3 molecule. 5

(2 × 15 = 30 Marks)

