S – 3441

Reg. No. : ....

Name : ....

Third Semester B.Sc. Degree Examination, February 2024

First Degree Programme under CBCSS

Chemistry

Core Course II

CH 1341 : INORGANIC CHEMISTRY II

(2020 Admission Onwards)

Time : 3 Hours

Max. Marks : 80

SECTION – A

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

1. Define bond order.

2. What are pseudohalogens?

3. What are fullerenes?

4. What are quantum dots?

5. What is a bonding molecular orbital?

6. What is packing fraction?

7. What is flint glass?

8. Arrange the molecules in the increasing order of their lattice energy. $NaCl$, $MgCl_2$ and $AlCl_3$.

P.T.O.

9. What is annealing?

10. What is the unit of radio activity?

<div align="right">(10 × 1 = 10 Marks)</div>

SECTION – B

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

11. What is the state of hybridization of B in BF_3 molecule and what is the shape of the molecule?

12. Name and formulate the compound known as inorganic benzene. Why is it called so?

13. A radioactive substance decays at such a rate that after 46 days, only 0.25 of its original amount is left. Calculate its disintegration constant

14. Explain the top-down approach of the preparation of nanomaterials.

15. Which has greater bond dissociation energy $-O_2$ or O_2^+? Why?

16. Mention any two uses of xenon.

17. What are borides?

18. What is the basicity of H_3PO_3? Explain your answer.

19. What are the factors that favor an increase in the polarizability of an anion?

20. Give any two applications of nanomaterials.

21. What is artificial radioactivity?

22. Explain inter-molecular hydrogen bonding with an example.

<div align="right">(8 × 2 = 16 Marks)</div>

SECTION – C

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

23. Apply the VSEPR theory to predict the shape of ClF_3.

24. Discuss the free electron theory of metallic bonding.

25. What are quantum dots? Give an example and an application.

26. Explain the terms mass defect and binding energy.

<div align="center">2</div>

27. Give the Born-Lande equation and explain the terms.

28. Discuss sp hybridization and the consequent geometry with an illustrative example.

29. Explain the process for glass manufacture.

30. Write a note on interhalogen compounds? Give the formulae of two of them.

31. Explain with examples, how radio isotopes are useful in medical diagnosis.

$(6 \times 4 = 24$ **Marks)**

SECTION – D

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

32. (a) Calculate the bond order of NO molecule from its MO configuration and draw the MO diagram.

   (b) 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.

   (c) What is meant by ion polarization? Discuss Fajans rules.

33. (a) Explain Born-Haber cycle.

   (b) Describe the Radio carbon dating (C-14 dating).

   (c) Write a note on radioactive disintegration series.

34. (a) Explain the electrical properties of nanomaterials.

   (b) Write a note on three dimensional silicates.

   (c) Discuss the properties and applications of Carbon nanotubes.

35. (a) Briefly explain about refractory carbides? Discuss their general properties.

   (b) Distinguish between bonding and antibonding molecular orbitals.

   (c) Mention the uses of the different classes of silicones.

$(2 \times 15 = 30$ **Marks)**

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