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**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**

**(2019 Admission)**

Time : 3 Hours Max. Marks : 80

SECTION – A

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

1. What is the shape of $NH_3$?
2. What is inorganic benzene?
3. What is the bond order of $N_2$?
4. Give one example of molecular solid.
5. How many hexagons are there in fullerene?
6. What is significance of n/p ratio of nucleus?
7. 'Long lived isotopes emits more energetic particles'. Whether this statement is true or false? Explain.
8. What are the contents of borosilicate glass?

P.T.O.

9. Name two silicide compounds.

10. What is salt like carbide?

**(10 × 1 = 10 Marks)**

SECTION – B

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

11. Write resonance structures of $CO_3^{2-}$.

12. Write any two limitations of valence bond theory.

13. Most ionic compounds have high melting point. What does this indicate?

14. What is meant by magic number?

15. State Geiger-Nuttal Rule.

16. Explain nuclear fission and fusion reactions.

17. Write a note on Van der Waals forces.

18. Define mass defect.

19. Discuss the structure and synthesis of borazene.

20. What are the applications of silicones?

21. What is structure of $XeF_4$?

22. Explain nuclear liquid drop model.

23. State Fajans rules.

24. Distinguish between intra and intermolecular hydrogen bonding with examples.

25. Write a brief notes on nitrides.

26. Write short note on carbon nanotubes.

**(8 × 2 = 16 Marks)**

## SECTION – C

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

27. Explain the structure of acetylene by hybridization method.

28. Discuss the applications of zeolites and carboranes.

29. What are radioactive tracers? Discuss the application of tracers in medicine.

30. What is neutron activation analysis?

31. Explain structure of two Radone compounds.

32. Define lattice energy and how to calculate by using Born-Lande equation.

33. Which of the following has dipole moment ? $H_2O$, $CCl_4$, $CHCl_3$, $CO_2$ Justify your answer.

34. Write down synthesis and uses of two borides.

35. Discuss the oxy acids of phosphorous.

36. Write a short note on nanomaterials in Lycurgus cup.

37. Write down the application of radioactive isotopes in medicine.

38. Explain any two bottom up approach in nanomaterial synthesis.

**(6 × 4 = 24 Marks)**

## SECTION – D

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

39. Explain the preparations, properties and structures any three compounds of the following

    (a) Interhalogen compounds

    (b) pseudohalogen compounds

40. Explain LCAO methods and draw the structure molecular orbital diagram of HF and CO

41. (a) Discuss the method of rock dating

    (b) A sample of uranium ore is found to contain 5.95 g of $^{238}U$ and 5.15g of $^{209}pb$. Calculate the age of ore. The half life of uranium ore is $4.5 \times 10^9$ years.

42. (a) What are application of Born Haber Cycle?

    (b) Explain Born Haber cycle for $MgCl_2$

43. Explain the following properties of nanomaterials

    (a) Magnetic

    (b) Optical

    (c) Catalytic

44. (a) What are the limitations of VBT? (7)

    (b) Free energy theory and band theory of metals. (8)

**(2 × 15 = 30 Marks)**

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