அரசினர் ஆடவர் கலைக்கல்லூரி (தன்னாட்சி), நந்தனம், சென்னை – 35.

CODE: **196309** TIME: 3 Hrs

NOVEMBER 2020 MAX. MARKS: 50

PART A *(10 x 2=20)*

*Answer any **TEN** questions.*

1. Determine the bond order for difluorine molecule (F_2).
2. Define equilibrium bond length, give its unit.
3. What are pseudo halogens? Give examples.
4. What is meant by the hybridization of atomic orbitals.
5. What is lanthanoid contraction?
6. What is fissile isotope? Give an example.
7. What is nuclear fission reaction? Give an example.
8. What are non-stoichiometric compounds? Give an example.
9. What are solid state electrolytes? Give an example
10. Distinguish between the conductors and insulators based on band gab.
11. Diborane is regarded as a soft Lewis acid. Why?
12. What are clathrates? Give an example.

PART B *(2 x 5=10)*

*Answer any **TWO** questions.*

13. Explain the structure and bonding of $XeCl_2$, XeF_6.
14. Explain in details the Molecular Orbital theory of bonding.
15. Discuss the variation in coordination numbers among complexes of the 4f group metals.
16. Explain the band theory of conductors and insulators.
17. Explain the structural features of solid anionic electrolyte.
18. Discuss the properties and application of garnets.
19. Describe about S-N compounds and states their uses.
20. Write a short note on clathrates compounds.

PART C *(2x 10=20)*

*Answer any **TWO** questions.*

21. a) Explain in detail the characteristics of VSEPR theory of bonding. (7 Marks)

    b) Illustrate the structure and bonding of any two interhalogen compounds. (3 Marks)

22. Discuss the various aspects of electronic spectra and magnetic moment of the lanthanoids.

23. a) Describe the principle, working and application of cyclotron. (8 Marks)

    b) Distinguish between fertile and fissile isotopes. (2 Marks)

24. a) Define n-type and p-type semiconductors giving suitable examples. (4 Marks)

    b) Explain in detail about the Dia, Para, Ferro magnetic properties of solid materials. (6Marks)

25. a) Explain the structure, properties of i) Metalloborane ii) Metallocarbazines (5 Marks)

    b)Describe the preparation and properties of cyclophosphazenes and cyclophosphazanes (5 Marks)

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