



Date: 24-10-2018
Time: 09:00-12:00

Dept. No.

Max. : 100 Marks

PART – A

Answer ALL the questions:

(10x2=20)

1. Write the sequence of the various orbitals in the increasing energy.
2. Discuss the variable valency of cations.
3. What are the factors that facilitate the formation of ionic bond?
4. What is lattice energy?
5. What is bond order? Calculate the bond order for H₂ molecule.
6. Write the geometry, bond angle and hybridization of (i) BF₃ (ii) CH₄
7. What are semiconductors?
8. Why is the density of ice less than that of water?
9. Give the advantages of liquid ammonia as a solvent.
10. What is oxidation number? Mention the possible oxidation numbers of the element, iron.

PART – B

Answer any EIGHT questions:

(8x5=40)

11. What do you understand by Heisenberg's uncertainty principle? Explain the concept of probability that follows from Heisenberg's uncertainty principle.
12. Give the postulates of Bohr's theory.
13. Give the factors influencing electronegativity.
14. What is meant by first ionization energy and second ionization energy? Why second ionization energy is much higher than first ionization energy?
15. What is polarization of ions? Write Fajan's rule regarding polarization.
16. Explain the hybridization and geometry of ammonia.
17. Draw the MO diagram for H₂ molecule.
18. (a) Explain the types of molecular orbitals.
(b) Explain the paramagnetic behaviour of O₂.
19. Write a short note on the types of hydrogen bonding.

20. What are Clathrates?
21. Explain the types of semiconductors.
22. What are protic and aprotic solvents?

PART

Answer any FOUR questions:

(4x10=40)

23. (a) How is the term electronegativity defined by Pauling, Allred and Rochow?
(b) What is inert pair effect?
24. (a) State modern periodic law. What is the cause of periodicity of elements? **(4)**
(b) Explain the factors affecting the lattice energy. **(6)**
25. (a) Discuss the Born Haber cycle for the determination of lattice energy.
(b) Explain the structure and hybridization of XeF₄.
26. (a) Give the exceptions of Octet rule. **(4)**
(b) Explain the band theory of metals. **(6)**
27. (a) What are Vanderwaal's forces? Explain the types of Vanderwaal's forces.
(b) Discuss the Lewis acid-base concept.
28. (a) How are acid and base defined in terms of (i) Arrhenius concept
(ii) Bronsted Lowry theory.
(b) Discuss the role played by molten salt as non-aqueous solvent.
