

R. P. SINGH

ENGINEERING CHEMISTRY  
SHORT ANSWER QUESTIONS

1. What are the conditions of combination of atomic orbitals.
2. What is meant by bonding and antibonding molecular orbitals.
3. Why water contracts when heated between  $0^{\circ}\text{C}$  and  $4^{\circ}\text{C}$ .
4. Discuss the band theory of metallic bond.
5. What is a liquid crystal. Distinguish between thermotropic and lyotropic liquid crystals with examples.
6. The density of NaCl is  $2.163 \text{ g/cc}$ . Calculate the edge length of its cubic cell, assuming that four molecules of NaCl are associated per unit cell.
7. Write down a brief notes on fullerenes and its applications.
8. Explain the structure of graphite. Also explain the reasons for its electrical and lubricating properties.
9. Distinguish between order and Molecularity of a reaction.
10. Define order of a reaction. What is condition that a second order reaction behaves like a first order?
11. What is activation energy? How is the rate constant of a reaction related to its activation energy?
12. Define the terms; Component, Phase and Degree of Freedom.
13. With the help of phase diagram of water, calculate the degree of freedom at triple point.
14. Describe a concentration cell and write down the formula for its EMF.
15. What is Galvanic cell. Describe at least two common types of reversible electrodes.
16. What is meant by the term "Passivity"?
17. How much rust ( $\text{Fe}_2\text{O}_3 \cdot 3\text{H}_2\text{O}$ ) will be formed when 100 kg of iron have completely rusted away?
18. Describe in brief the electrochemical theory of Corrosion.
19. Define Enantiomers and Diastereoisomers.
20. Draw the Potential energy diagram for the various conformations of n-butane.
21. By using the appropriate examples, discuss and illustrate the stereochemical implication of  $\text{S}_\text{N}1$  and  $\text{S}_\text{N}2$  reactions?
22. Write the mechanism of Hoffmann rearrangement
23. What are carbonium ions? Show hybridisation in carbocation.
24. Differentiate between Thermosetting and Thermoplastics.
25. What are Bio-degradable polymers.
26. Describe in brief about conducting polymers with their applications.

27. "IR spectra is often characterized as molecular finger-prints".  
Comment on it.
28. How many NMR signals do you expect from each of the following compounds. (i)  $\text{CH}_3\text{OCH}_3$  (ii)  $\text{CH}_3\text{OCH}_2\text{CH}_3$  (iii)  $\text{CH}_3-\text{CH}_3$
29. Define the terms chromophore and auxochrome, in UV-visible spectroscopy.)
30. Define HCV and LCV. calculate LCV of a fuel which has 890 Hydrogen and its HCV is 6500 cal/gm. (given latent heat of steam = 580 cal/gm)
31. Write a note on biomass and biogas.
32. Give a brief account of the treatment of boiler feed water of Calgon process.
33. What is Potable water? What are its chief requirements?
34. What do you understand by Hardness of water.
35. Define the terms titrant and titrand.?