



- iv) The energy of an electron in Bohr's atom as we move away from the nucleus.
- a) remains the same
 - b) decreases
 - c) increases
 - d) sometimes increases, sometimes decreases.
- v) According to de Broglie's equation, the momentum of a particle in motion is proportional to wavelength.
- a) inversely
 - b) directly
 - c) not
 - d) none of these.
- vi) Number of phases at triple point is
- a) 0
 - b) 1
 - c) 2
 - d) 3.
- vii) In SN_2 reaction,
- a) carbocation is produced
 - b) racemic mixture is produced
 - c) inversion of structure takes place
 - d) none of these.



3. a) What is ionic mobility ? Explain how ionic mobility vary with concentration.
- b) Calculate the shortest wavelength in the absorption spectrum of deuterium ($R_H = 109737 \text{ cm}^{-1}$). The velocity of an electron is $2 \times 10^8 \text{ cmsec}^{-1}$. 2 + 3
4. How can the principle of radioisotopes be used in clinical assay ? Write down the hazardness of radioactivity. 3 + 2
5. Explain with example Pauli's exclusion principle. Write down correct set of quantum numbers for the outermost electron of chromium (Cr) atom. 3 + 2
6. Write down the Fischer projection of the following compounds : 2 + 1 + 2
- a) (2R, 3S) -2, 3- di hydroxy pentane
- b) L (-)- Glycine
- c) (Z)-2-bromo pent 2-ene.



GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

7. a) Define : Phase, component and degree of freedom.
- b) Write in short on phase diagram of water.
- c) What are Nernst distribution law, azeotropic mixture and critical solution temperature ? $3 + 6 + 6$
8. a) What are optical activity and specific rotation?
- b) What are elements of symmetry ? Explain each of them.
- c) Explain the terms 'enantiomers', 'diastereomers' and 'meso-compound'. $(2 + 2) + (1 + 4) + (2 \times 3)$
9. a) Define Hybridization and describe three hybridized states of carbon.
- b) Illustrate the formation of sigma bond and pi bond.



c) Explain why :

- i) The C-C bond length in alkanes is more than the C-C bond length in alkenes, which is again more than that in alkynes.
- ii) The bond angle in a sp hybridized carbon is 180° .

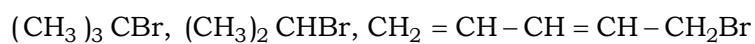
$$7 + 3 + (2.5 \times 2)$$

10. a) Deduce the relation for radioactivity. The half-life of radium is 1590 years. How long will it take for 1 gm. of the element to lose 0.1 gm ?
- b) Write the nature of α , β positron decay and k -capture.
- c) Briefly explain Meson theory for nuclear stability. What do you mean by mass defect and nuclear binding energy ?

$$5 + 5 + 5$$



11. Draw the orbital representation of acetylene with hybridization state. Define polarity and polarizability. Arrange the order of SN^1 reactivity of following with proper explanation.



Define diastereomers.

5 + 4 + 5 + 1

