ANSWERS

I. Multiple Choice Questions (Type-I)

1. (ii)	2. (iv)	3. (ii)	4. (iii)	5. (iii)	6. (iv)
7. (iv)	8. (ii)	9. (i)	10. (ii)	11. (i)	12. (iv)
13. (iii)	14. (ii)	15. (ii)			

II. Multiple Choice Questions (Type-II)

16. (i), (iv)	17. (i), (iii), (iv)	18. (ii), (iii)
19. (ii)	20. (i), (iii)	21. (i), (iii)
22. (i), (ii)		

III. Short Answer Type

27. White ppt. of Ag_2SO_4 will be formed.

29. Electronegativity increases with increasing '*s*' character.

    $sp^3 < sp^2 < sp$

30. $CH_3—CH_2—CH_2—\overset{\delta-}{C}H_2—\overset{\delta+}{Mg}—X$. Since electronegativity of carbon is more than magnesium it will behave as $CH_3—CH_2—CH_2—\overset{\ominus}{\ddot{C}}H_2\overset{+}{M}gBr$.

31. Metamerism.

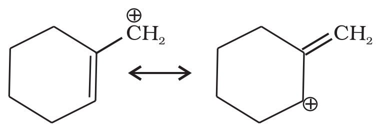
32. The four carbon chain. Selected chain should have maximum number of functional groups.

33. DNA and RNA have nitrogen in the heterocyclic rings. Nitrogen present in rings, azo groups and nitro groups cannot be removed as ammonia.

35. $CH_3—O—\overset{\oplus}{C}H_2$ (I.) $\qquad CH_3—\overset{\oplus}{\ddot{O}}=CH_2$ (II.)

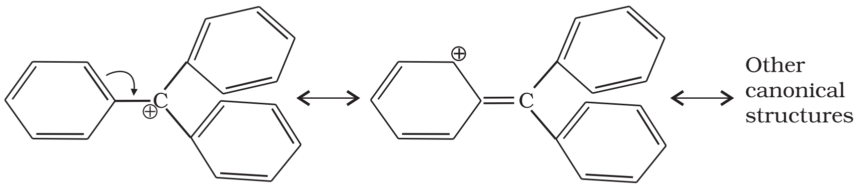
    Structure II is more stable because every atom has complete octet.

36. Structure I is more stable due to resonance. (See resonance structure 'A' and 'B'). No resonance is possible in structure II.



(A) (B)

37. Stabilised due to nine possible canonical structures.



38. Four possible carbocations are

(I) $CH_3—CH(CH_3)—CH_2—\overset{+}{C}H_2$

(II) $CH_3—CH(CH_3)—\overset{+}{C}H—CH_3$

(III) $CH_3—\overset{+}{C}(CH_3)—CH_2—CH_3$

(IV) $\overset{+}{C}H_2—CH(CH_3)—CH_2—CH_3$

Order of increasing stability   I < IV < II < III

39. In Lassaigne's test SCN^- ions are formed due to the presence of sulphur and nitrogen both. These give red colour with Fe^{3+} ions. This happens when fusion is not carried out in the excess of sodium. With excess of sodium the thiocyanate ion, if formed, is decomposed as follows:

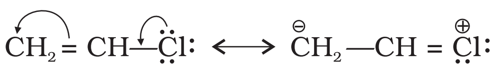
$$NaSCN + 2Na \longrightarrow NaCN + Na_2S$$

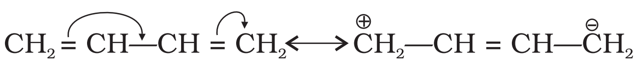
40. (i) 3-Ethyl-4-methylheptan-5-en-2-one

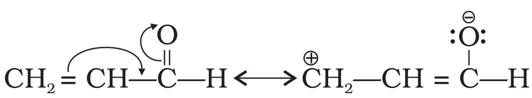
(ii) 3-Nitrocyclohex-1-ene.

41. (a) $CH_3—CH_2—CH_2—CH_2—CH_2—CH_2—CH_2Br$

(b) $CH_3—CH_2—CH(Br)—CH_2—CH_2—CH_2—COOH$

42. (i) 

(ii) 

(iii) 

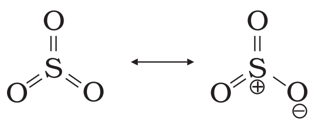
43. (i) $\overset{\oplus}{C}H_3$, The replacement of hydrogen by bromine increases positive charge on carbon atom and destabilises the species.

(ii) $\overset{\ominus}{C}—Cl_3$ is most stable because electronegativity of chlorine is more than hydrogen. On replacing hydrogen by chlorine, negative charge on carbon is reduced and species is stabilised.

44.

	Inductive effect		**Resonance effect**
(i)	Use σ-electrons	(a)	Use π- electrons or lone pair of electrons
(ii)	Move up to 3-carbon atoms	(b)	All along the length of conjugated system
(iii)	Slightly displaced electrons	(c)	Complete transfer of electrons

45. CH_3OH; Any possible contributing structure will have charge separation and incomplete octet of electrons on atoms. So the structure will be unstable due to high energy. e.g., $\overset{\oplus}{C}H_3\overset{\ominus}{O}H$.

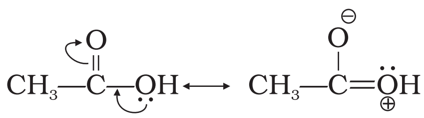
46. 

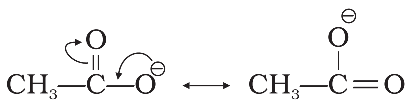
Three highly electronegative oxygen atoms are attached to sulphur atom. It makes sulphur atom electron deficient. Due to resonance also, sulphur acquires positive charge. Both these factors make SO_3 an electrophile.

47. I > II

48. Simple distillation can be used because the two compounds have a difference of more than 20° in their boiling points and both the liquids can be distilled without any decomposition.

49. Resonating structures are as follows:

(A) 

(B) 

Structure 'B' is more stabilised as it does not involve charge separation.

IV. Matching Type

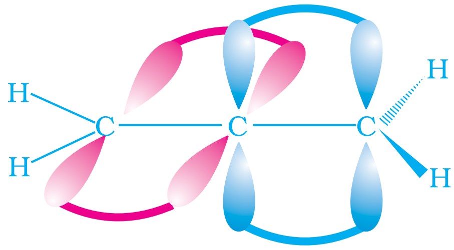
50.	(i) → (e)	(ii) → (d)	(iii) → (a)	(iv) → (b)	(v) → (c)
51.	(i) → (c)	(ii) → (f)	(iii) → (b)	(iv) → (a)	(v) → (d)
	(vi) → (e)				
52.	(i) → (c)	(ii) → (e)	(iii) → (a)	(iv) → (b)	(v) → (d)
53.	(i) → (a),	(ii) → (a)	(iii) → (b)		
54.	(i) → (a), (b), (d)		(ii) → (b)	(iii) → (b)	(iv) → (c), (d)

V. Assertion and Reason Type

55. (i) 56. (iv) 57. (i) 58. (iv) 59. (iii) 60. (i)

VI. Long Answer Type

61. No. It is not a planar molecule.



Central carbon atom is *sp* hybridised and its two unhybridised *p*-orbitals are perpendicular to each other. The *p*-orbitals in one plane overlap with one of the *p*-orbital of left terminal carbon atom and the *p*-orbital in other plane overlaps with *p*-orbital of right side terminal carbon atom. This fixes the position of two terminal carbon atoms and the hydrogen atoms attached to them in planes perpendicular to each other. Due to this the pair of hydrogen atoms attached to terminal carbon atoms are present in different planes.