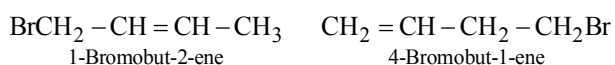
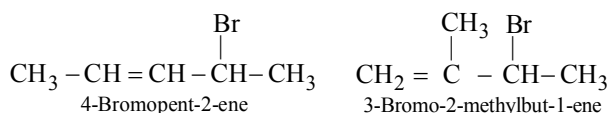
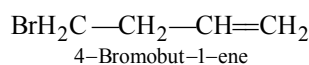


ANSWER KEYS

1	(d)	7	(c)	13	(d)	19	(c)	25	(a)	31	(d)	37	(c)	43	(d)	49	(b)	55	(d)
2	(d)	8	(b)	14	(b)	20	(d)	26	(a)	32	(d)	38	(a)	44	(a)	50	(b)		
3	(d)	9	(b)	15	(d)	21	(a)	27	(c)	33	(b)	39	(c)	45	(c)	51	(a)		
4	(d)	10	(c)	16	(c)	22	(d)	28	(b)	34	(c)	40	(c)	46	(a)	52	(c)		
5	(a)	11	(b)	16	(a)	23	(b)	29	(a)	35	(b)	41	(d)	47	(a)	53	(c)		
6	(c)	12	(c)	18	(c)	24	(d)	30	(c)	36	(a)	42	(a)	48	(a)	54	(d)		



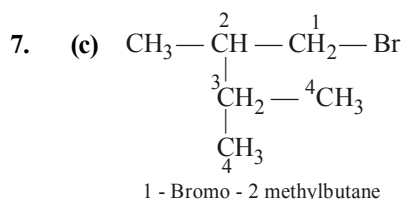
1. (d) 4-Bromobut-1-ene is not an allylic halide



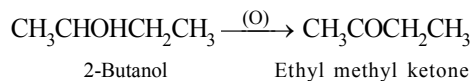
2. (d) Presence of electron withdrawing group increases the acidic strength. So, *m*-chlorophenol is most acidic among all the given compounds.
3. (d) H_3PO_4 is tribasic so, $N = M \times nf = 1 \times 3 = 3N$
4. (d) All compounds have tertiary alkyl group but bond between carbon and iodine (C—I) is weakest bond due to higher difference in size of carbon and iodine.
5. (a) **Structure of DNA** - It consists of two polynucleotide chains, each chain forms a right handed helical spiral with ten bases in one turn of the spiral. The two chains coil to double helix and run in opposite direction held together by hydrogen bonding.
6. (c) As per formula,

$$\text{radius ratio} = \frac{\text{radius of cation}}{\text{radius of anion}} = \frac{94}{146} = 0.643$$

Since the value is between 0.414 – 0.732 hence the coordination no. will be 6 and geometry will be octahedral.



8. (b) No. of nearest neighbour = 8 (All body centre atom w.r.t. corner atom).
No. of next nearest neighbour = 6 (No. of corner atoms along edge w.r.t. to any corner).
9. (b) Those amino acids that cannot be synthesized in our body and must be supplied in diet is called essential amino acid for ex. valine, Histidine, Isoleucine etc.
10. (c) Secondary alcohols oxidise to produce ketone.



11. (b) $\text{H}_3\text{C}-\text{H}_2\text{C}-\overset{\text{Br}}{\text{H}-\text{C}}-\text{CH}_2-\text{CH}_3$
- IUPAC name is 3-bromopentane.

12. (c) $\frac{P^{\circ} - P_s}{P^{\circ}} = \frac{n}{N} = \frac{w}{m} \times \frac{M}{W}$

$$0.1 = \frac{12}{m} \times \frac{18}{108} \Rightarrow m = \frac{12 \times 18}{0.1 \times 108} = 20$$

13. (d) $2\text{Ag}_2\text{O}(\text{s}) \rightarrow 4\text{Ag}(\text{s}) + \text{O}_2(\text{g})$
 $2\text{Pb}_3\text{O}_4(\text{s}) \rightarrow 6\text{PbO}(\text{s}) + \text{O}_2(\text{g})$
 $2\text{PbO}_2(\text{s}) \rightarrow 2\text{PbO}(\text{s}) + \text{O}_2(\text{g})$
14. (b) In ZnS structure, sulphide ions occupy all *fcc* lattice points while Zn^{2+} ions are present in alternate tetrahedral voids.
15. (d) Let the mass of methane and oxygen = m g.
 Mole fraction of O_2

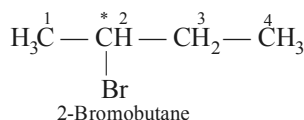
$$= \frac{\text{Moles of O}_2}{\text{Moles of O}_2 + \text{Moles of CH}_4}$$

$$= \frac{m/32}{m/32 + m/16} = \frac{m/32}{3m/32} = \frac{1}{3}$$

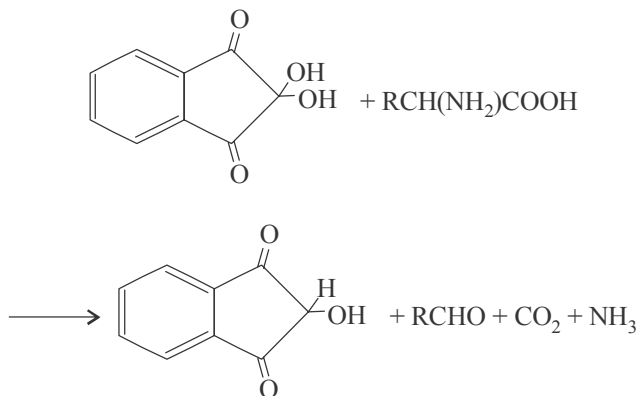
Partial pressure of O_2 = Total pressure \times mole fraction of

$$\text{O}_2, P_{\text{O}_2} = P \times \frac{1}{3} = \frac{1}{3}P$$

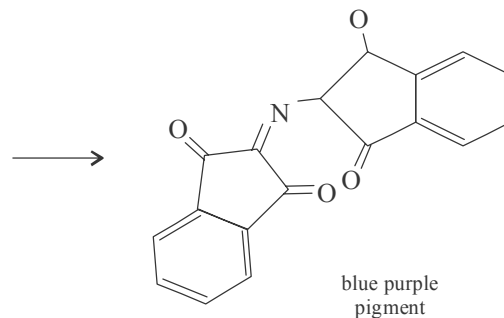
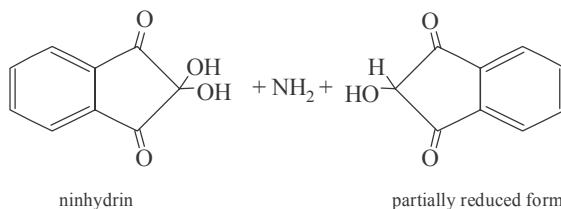
16. (c) In *bcc* the atoms touch along body diagonal
 $\therefore 2r + 2r = \sqrt{3}a$
 $\therefore r = \frac{\sqrt{3}a}{4} = \frac{\sqrt{3} \times 4.29}{4} = 1.857\text{\AA}$
17. (a) Carbon in which four bonds are different is known as chiral carbon.



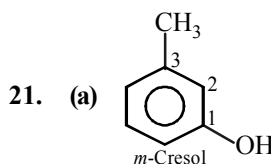
18. (c) Ninhydrin is often used to detect α -amino acids and also free amino and carboxylic acid groups on proteins and peptides. When about 0.5 mL of a 0.1% solution of ninhydrin is boiled for one or two minutes with a few mL of dilute amino acid or protein solution, a blue color develops. Ninhydrin degrades amino acids into aldehydes, ammonia, and CO_2 through a series of reactions; the net result is ninhydrin in a partially reduced form hydrindantin;



Ninhydrin then condenses with ammonia and hydrindantin to produce an intensely blue or purple pigment, sometimes called Ruhemann's purple:



19. (c) $\text{R-OH} + \text{SOCl}_2 \xrightarrow{\text{Pyridine}} \text{RCl} + \text{SO}_2\uparrow + \text{HCl}\uparrow$
 SO_2 and HCl being gases escape leaving behind pure alkyl halide.
20. (d) Due to high N—F bond strength, NF_3 is highly stable and hence inert towards hydrolysis.



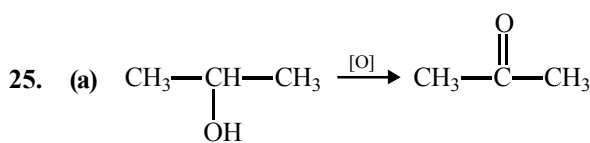
Its IUPAC name is 3-methylphenol.

22. (d) Effective number of 'A' atoms = $\left(8 \times \frac{1}{8}\right) + \left(4 \times \frac{1}{2}\right) = 3$

$$\text{Effective number of 'B' atoms} = \left(12 \times \frac{1}{4}\right) + 1 = 4$$

\therefore Formula of the solid = A_3B_4 .

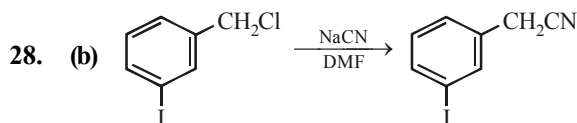
23. (b) 5-10 % methanol and remaining ethanol is called methylated spirit. It is also known as denatured alcohol because it is unfit for drinking.
24. (d) To increase the solubility of CO_2 in soft drinks and soda water, the bottle is sealed under high pressure.



2° alcohol more easily oxidised than 3° alcohol.

26. (a) $-3, +3, +5$

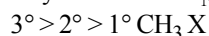
27. (c) "Pentaacetate of glucose does not react with hydroxylamine" showing absence of free CHO group. This can not be explained by open structure of glucose while all other properties can be easily explained.



Nuclear substitution will not take place.

29. (a) All those compounds which follow S_N1 mechanism during nucleophilic substitution reaction will give racemic mixture.

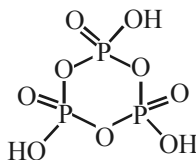
Order of reactivity of alkyl halides for S_N1 .



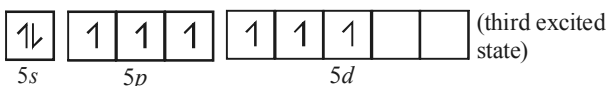
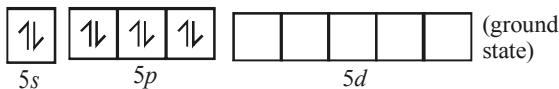
Thus, $\text{CH}_3 - \underset{\text{C}_2\text{H}_5}{\text{CH}} - \text{Br}$ contains a 2° chiral carbon, so

it gives a racemic product.

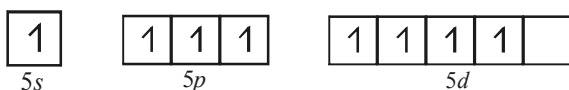
30. (c) In cyclic metaphosphoric acid, number of P–O–P bonds is three.



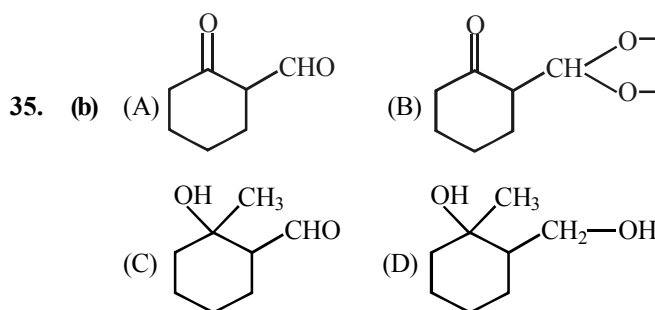
31. (d) At intersection $P_1 = P_2$ and $x_1 = x_2$
32. (d) OF_2 ; among the following O and F, F is more electronegative than oxygen. So OF_2 cannot be called oxide because in that case O is in -2 oxidation state which is not possible, so OF_2 is called oxygen difluoride.
33. (b) In secondary structure of DNA adenine forms hydrogen bonds with thymine whereas cytosine forms hydrogen bonds with guanine.
34. (c) Xenon undergo sp^3 hybridization.



In the fourth excited state, xenon atom has 8 unpaired electrons



One s and three p orbital undergo sp^3 hybridization. Four sp^3 hybrid orbitals form four σ bonds with oxygen atoms. They are σ_{sp^3-p} . Four $p\pi-d\pi$ bonds are also formed with oxygen atoms by the unpaired electrons.

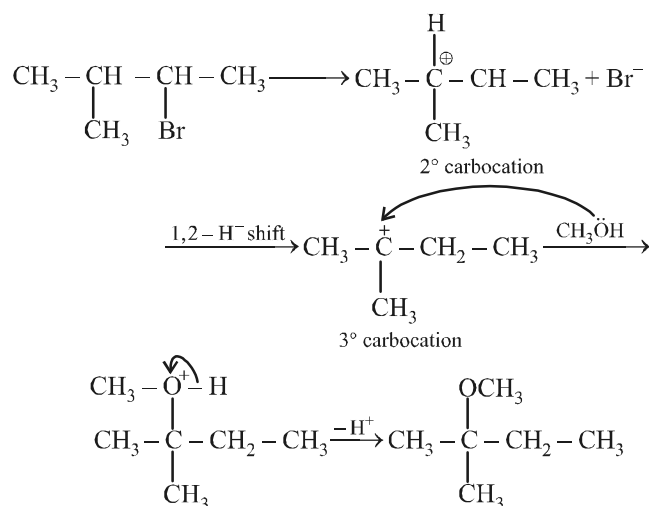


36. (a) SO_3 forms trimer in solid state.
37. (c) On increasing the pressure over the solution phase by compressing the gas to a smaller volume (in fig b), increase the number of gaseous particles per unit volume over the solution and also the rate at which the gaseous particles are striking the surface of solution to enter it. The solubility of the gas will increase until a new equilibrium is reached resulting in an increase in the pressure of a gas above the solution. Thus, its solubility increases.

Trick: One of the options (c) or (d) must be the answer.

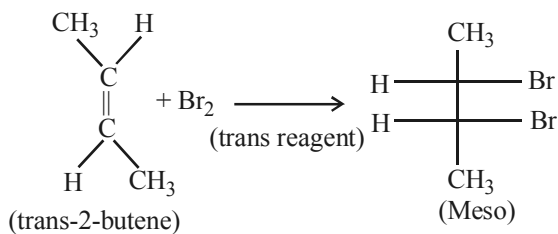
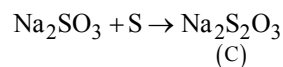
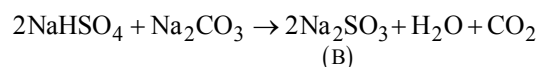
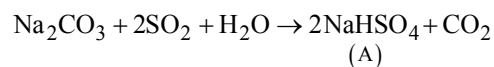
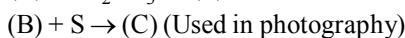
38. (a) Mixture of methanol and acetone show a positive deviation from Raoult's law. Molecules in pure methanol are hydrogen bonded. On adding acetone, its molecules enters in between the host molecules and break some of the hydrogen bonds between them. Therefore, the intermolecular attractive forces between the solute-solvent molecules are weaker than those between the solute-solute and solvent-solvent molecules. Other three remaining options will show negative deviation.

39. (c)



40. (c) DNA fingerprinting is same for every cell and cannot be altered by any known treatment.

41. (d)

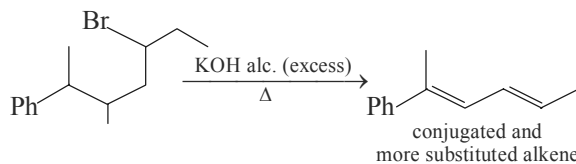
42. (a) Inorganic compound + SO₂ in aq. medium → (A)

43. (d) For a fcc unit cell

$$r = \frac{\sqrt{2}a}{4}$$

$$a = \frac{4r}{\sqrt{2}} = 2\sqrt{2} \times 0.14 = 0.39 \approx 0.4 \text{ nm.}$$

44. (a) Dehydrohalogenation (β-elimination) occurs as:



45. (c) Due to the formation of passive film of oxide chromium does not dissolve in nitric acid.

46. (a)

47. (a) At high altitudes, the partial pressure of oxygen is less than that at the ground level. This leads to low concentrations of oxygen in the blood and tissues of people living at high altitudes or climbers. Low blood oxygen causes climbers to become weak and unable to think clearly, symptoms of a condition known as anoxia.

48. (a) *p*-nitrophenol is more acidic than phenol because nitro group helps in the stabilisation of the phenoxide ion by dispersal of negative charge due to resonance.

49. (b) Interhalogen compounds are useful fluorinating agents.

50. (b) 51. (a) 52. (c)

53. (c) The bond energy of interhalogen compounds is less than the bond energy of halogens.

54. (d) All halogens (leaving F-F) have stronger bond than that in interhalogens.

55. (d) Interhalogen compounds are not highly volatile.