

ANSWERS

I. Multiple Choice Questions (Type-I)

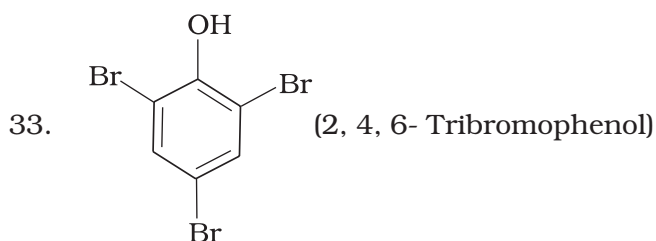
1. (iv) 2. (i) 3. (iii) 4. (iii) 5. (ii) 6. (iii)
7. (iii) 8. (i) 9. (iii) 10. (ii) 11. (i) 12. (ii)
13. (iv) 14. (ii) 15. (iii) 16. (i)

II. Multiple Choice Questions (Type-II)

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

III. Short Answer Type

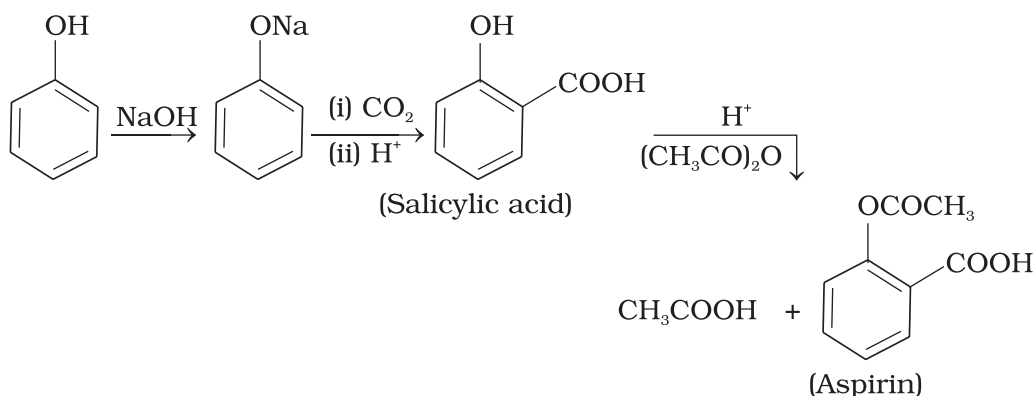
22. $\begin{array}{c} \text{CH}_2 - \text{CH} - \text{CH}_2 \\ | \quad | \quad | \\ \text{OH} \quad \text{OH} \quad \text{OH} \end{array}$; Propane-1,2,3-triol
23. (A) 3-Ethyl-5-methylhexane-2,4-diol, (B) 1-Methoxy-3-nitrocyclohexane
24. 3-Methylpent-2-ene-1,2-diol
25. (i) Hydrogen bonding (ii) Size of alkyl/aryl group.
26. Alcohol is made unfit for drinking by mixing some copper sulphate and pyridine in it. This is called denatured alcohol.
27. CrO_3 , pyridine and HCl. (Pyridinium chlorochromate)
28. 2-Chloroethanol, due to -I effect of chlorine atom.
29. CrO_3 , Pyridine and HCl (Pyridinium chlorochromate)
30. Any strong oxidising agent e.g., acidified KMnO_4 or $\text{K}_2\text{Cr}_2\text{O}_7$.
31. Ortho nitrophenol, [**Hint** : intramolecular hydrogen bonding in *o*-nitrophenol and intermolecular hydrogen bonding in *p*-nitrophenol.]
32. *o*-Nitrophenol, [**Hint** : CH_3 group is electron releasing]



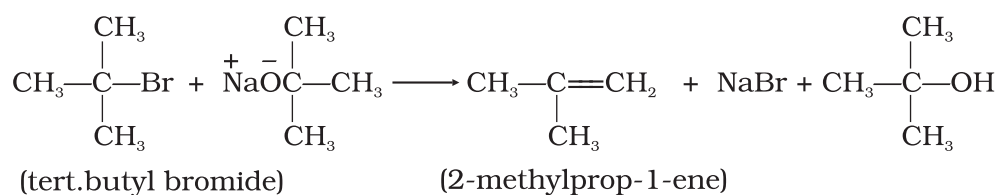
34. Increasing order of acidity :
o-cresol < phenol < *o*-nitrophenol

[Hint : In substituted phenols, the presence of electron withdrawing groups, enhance the acidic strength of phenol whereas, electron releasing groups decrease the acidic strength of phenol.]

35. Decreasing order of reactivity of sodium metal is :
 $1^\circ > 2^\circ > 3^\circ$
36. **[Hint :** It gives phenol]
37. **[Hint :** $\text{H}_2\text{O} > \text{ROH} > \text{HC} \equiv \text{CH}$]
38. See NCERT textbook for Class XII
39. **[Hint :** Using Grignard reagent]
40. See NCERT textbook for Class XII
41. See NCERT textbook for Class XII
42. See NCERT textbook for Class XII
43. See NCERT textbook for Class XII
44. See NCERT textbook for Class XII
45. An alcohol reacts with conc. HCl and ZnCl_2 (Lucas reagent) to give carbocation. More stable is the carbocation, faster is the reaction.
- 46.



47. Phenol is more easily nitrated than benzene as the presence of —OH group in phenol increases the electron density at ortho and para positions in benzene ring by +R effect. The nitration, being an electrophilic substitution reaction is more facile where the electron density is more.
48. Phenoxide ion is more reactive than phenol towards electrophilic aromatic substitution and hence undergoes electrophilic substitution with carbon dioxide which is a weak electrophile.
49. In phenol, C—O bond is less polar due to electron-withdrawing effect of benzene ring whereas in methanol, C—O bond is more polar due to electron-releasing effect of —CH₃ group.
50. In *tert*-butyl halides, elimination is favoured over substitution, so alkene is the only reaction product and ether is not formed.



51. See NCERT textbook for Class XII.
52. See NCERT textbook for Class XII.
53. See NCERT textbook for Class XII.
54. See NCERT textbook for Class XII.
55. This is due to the fact that—
- In phenol, conjugation of unshared electron pair over oxygen with aromatic ring results in partial double bond character in carbon-oxygen bond.
 - In phenol, oxygen is attached to a sp^2 hybridised carbon atom while in methanol, it is attached to a sp^3 hybridised carbon atom. The bond formed between oxygen and sp^2 hybridised carbon is more stable than that formed between oxygen and sp^3 hybridised carbon.
56. Increasing order of acidity is ethanol < water < phenol. The phenoxide ion obtained after the removal of a proton is stabilised by resonance whereas the ethoxide ion obtained after the removal of a proton is destabilised by '+I' effect of $-\text{C}_2\text{H}_5$ group. Therefore phenol is stronger acid than ethanol. On the other hand ethanol is weaker acid than water because electron releasing $-\text{C}_2\text{H}_5$ group in ethanol increases the electron density on oxygen and hence the polarity of O—H bond in ethanol decreases which results in the decreasing acidic strength. Hence acidic strength increases in the order given above.

IV. Matching Type

57. (i) — (d), (ii) — (c), (iii) — (f), (iv) — (a); (v) — (g), (vi) — (b)
58. (i) — (d), (ii) — (e), (iii) — (b), (iv) — (a)
59. (i)—(e), (ii)—(f), (iii)—(d), (iv)—(c), (v)—(a), (vi)—(b)
60. (i) —(d), (ii) — (a), (iii) — (f), (iv) — (e); (v) — (c), (vi) — (b)

V. Assertion and Reason Type

61. (ii) 62. (i) 63. (iv) 64. (iv) 65. (ii) 66. (iv)
67. (v) 68. (iii) 69. (ii) 70. (iv)

VI. Long Answer Type

71. Consult NCERT textbook for Class XII.
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74. Consult NCERT textbook for Class XII.