JEE MAIN ANSWER KEY & SOLUTIONS

SUBJECT :- CHEMISTRY

CLASS :- 12th **PAPER CODE :- CWT-8**

CHAPTER :- ALCOHOL PHENOL ETHER

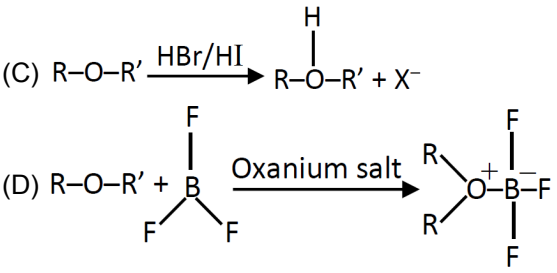
ANSWER KEY

1.	(B)	**2.**	(C)	**3.**	(A)	**4.**	(A)	**5.**	(D)	**6.**	(C)	**7.**	(A)
8.	(D)	**9.**	(B)	**10.**	(B)	**11.**	(B)	**12.**	(C)	**13.**	(D)	**14.**	(A)
15.	(D)	**16.**	(D)	**17.**	(B)	**18.**	(B)	**19.**	(A)	**20.**	(D)	**21.**	58
22.	2	**23.**	3	**24.**	3	**25.**	2	**26.**	4	**27.**	8	**28.**	6
29.	4	**30.**	3										

SOLUTIONS

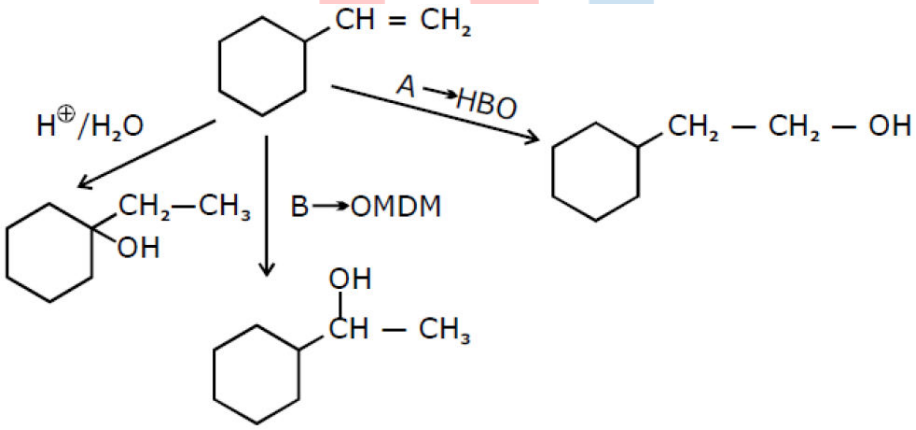
1. (B)

Sol. (A) Fact



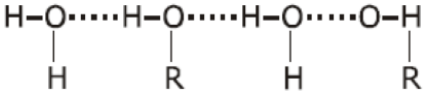
2. (C)

Sol. HBO → Hydroboration oxidation OMDM → Oxymercuration Demercuration.



3. (A)

Sol. Alcohols are soluble in water. This is due to the hydroxyl group in the alcohol which is able to form hydrogen bond with water molecules. Alcohol with a smaller hydrocarbon chains are very soluble. As the length of the hydrocarbon chain increases, the solubility in water decreases.



4. (A)

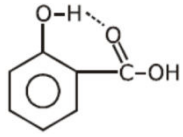
Sol. $CH_3-CH_2-CH_2-OH \xrightarrow{\text{oxidation}} CH_3-CH_2-COOH$

(C_3H_8O) $(C_3H_6O_2)$

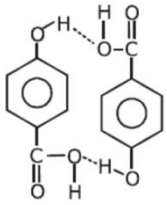
(Primary alcohol)

5. (D)

Sol.



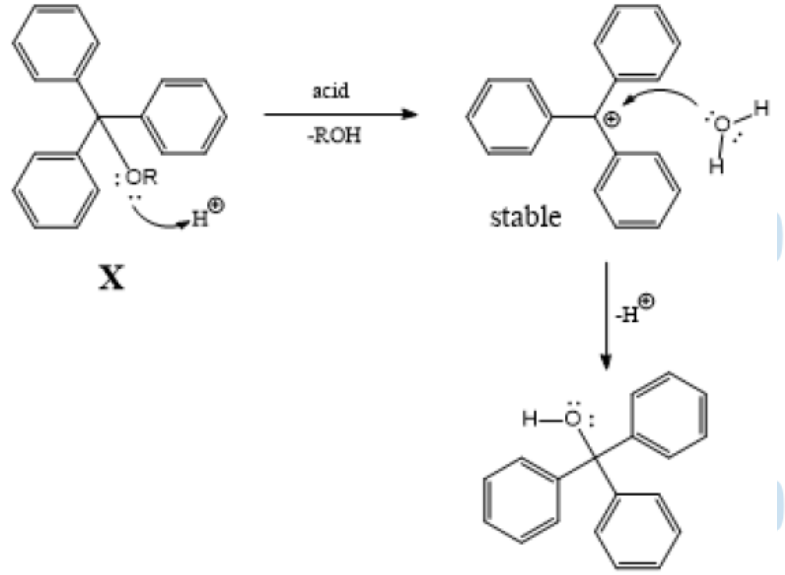
More stabilised by intramolecular hydrogen bonding.



More strong intermolecular forces increase the boiling point.

6. (C)

Sol. The ether has a non-descript alkyl group 'R' onthe one side and a triphenylmethyl group on the other side. The oxygen gets protonated and ROH is an excellent leaving group under these conditions. This is because the triphenylmethylium cation is super stable

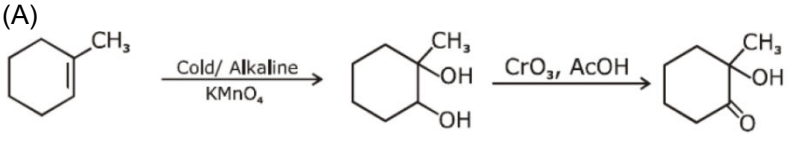


Any factor that would improve the stability of the carbocation will make the hydrolysis faster! If any one of the phenyl groups is replaced by a methyl group, the loss of a phenyl group will be destabilizing the intermediate carbocation. This is because the methyl group's hyperconjugation is no match for the highly stabilizing phenyl ring (via conjugation).

Also, replacing a phenyl ring with a para-methoxyphenyl group will have a greater overall stabilizing effect on the intermediate carbocation. This is because the progressive increase in electron density through the carbon chain via the conjugation or resonance of the methoxy oxygen atom. Two such rings will make the reaction go fastest among the given options.

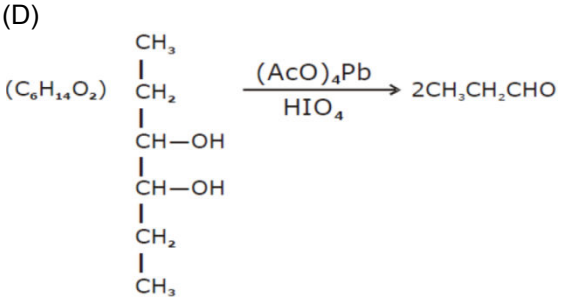
7. (A)

Sol.



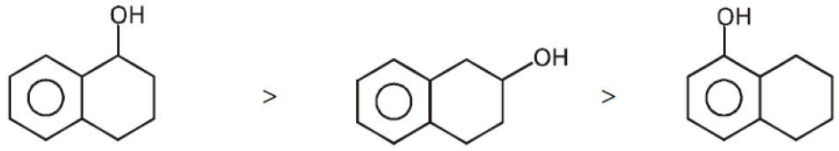
8. (D)

Sol.



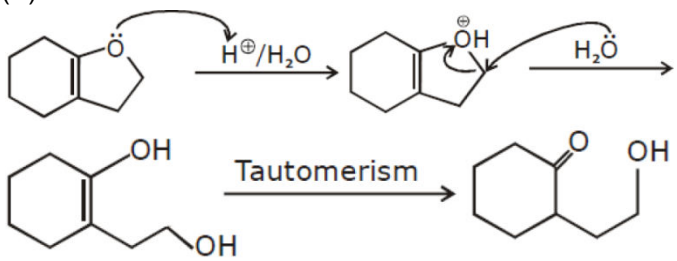
9. (B)

Sol. Order of sability of intermediate dehydration$\propto$ stability of carbocation.



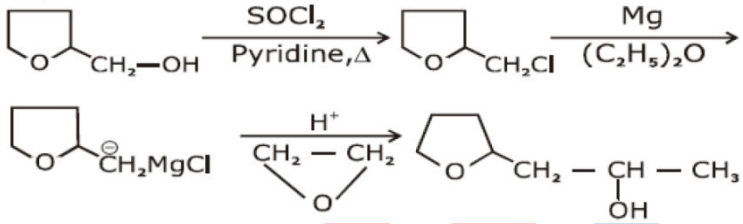
10. (B)

Sol.



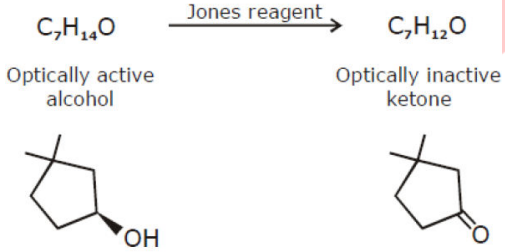
11. (B)

Sol.



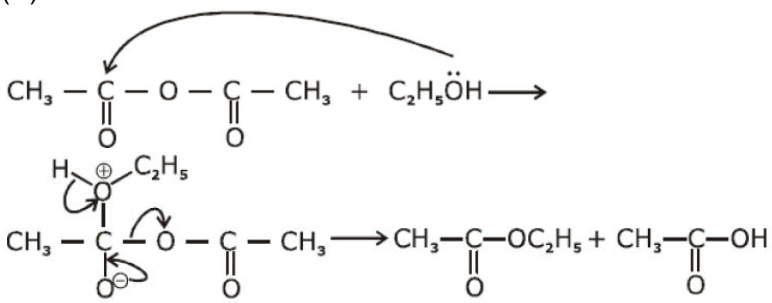
12. (C)

Sol.



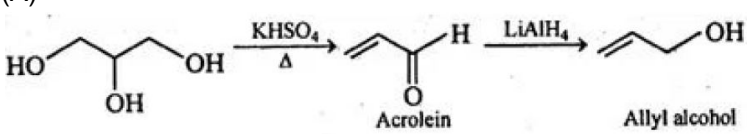
13. (D)

Sol.



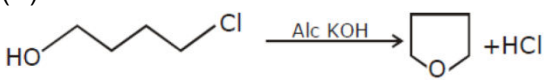
14. (A)

Sol.

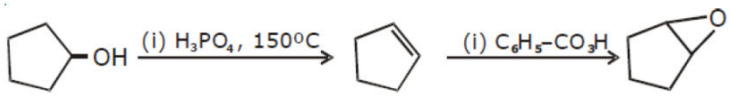


15. (D)

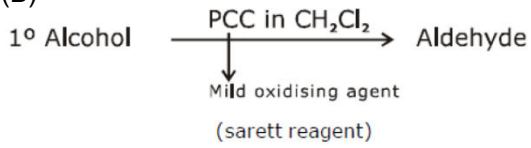
Sol.



16. (D)

Sol. 

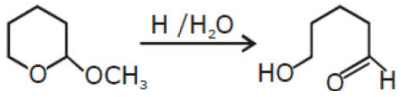
17. (B)

Sol. 

18. (B)

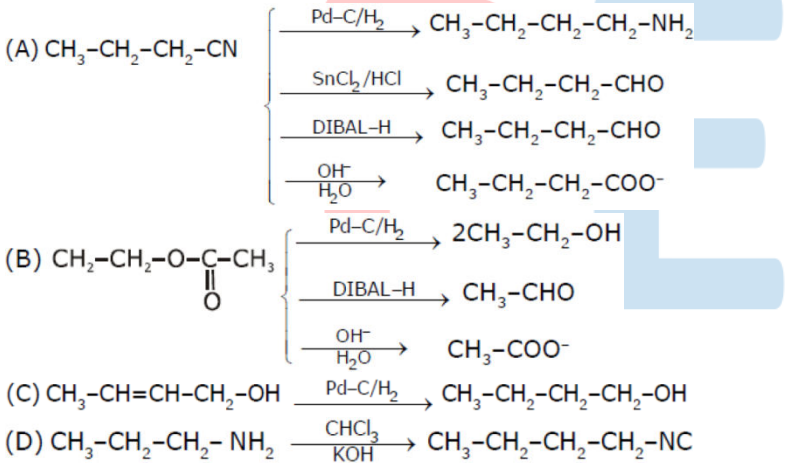
Sol. The Williamson ether synthesis is an organicreaction used to convent an alcohol and an alkylhalide to ether using a base such as NaOH. Themechanism begins with the base abstracting theproton from the alcohol to form an alkoxideintermediate. The alkoxide then attacks thealkyl halide in a nucleophilic substitutionreaction (S_N2), which results in the formation of the final ether product and a metal halide by product.

19. (A)

Sol. 

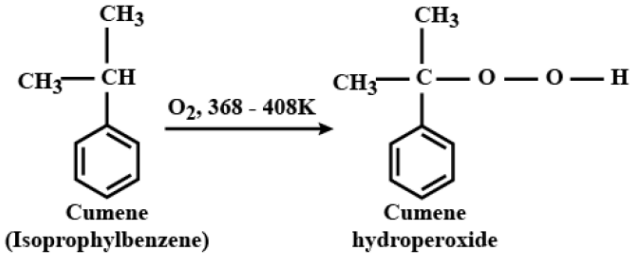
20. (D)

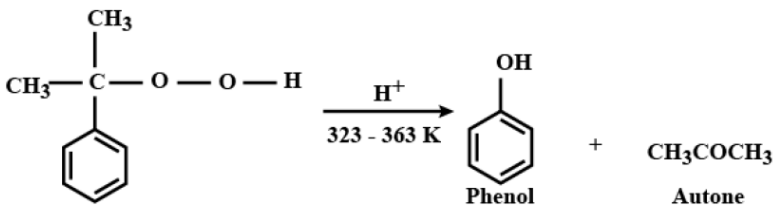
Sol. A → Q, S, T ; B → S, T; C → P; D → R



21. 58

Sol. 58.00 g/mole

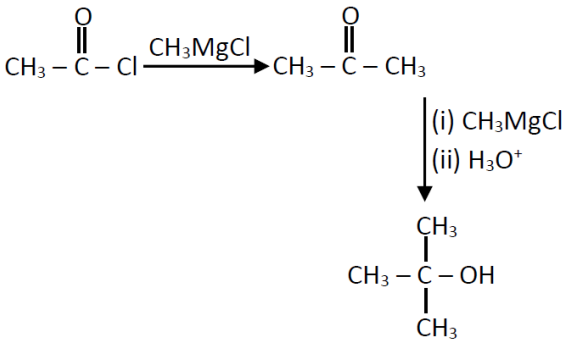




Compound Z is acetone.

22. 2

Sol.



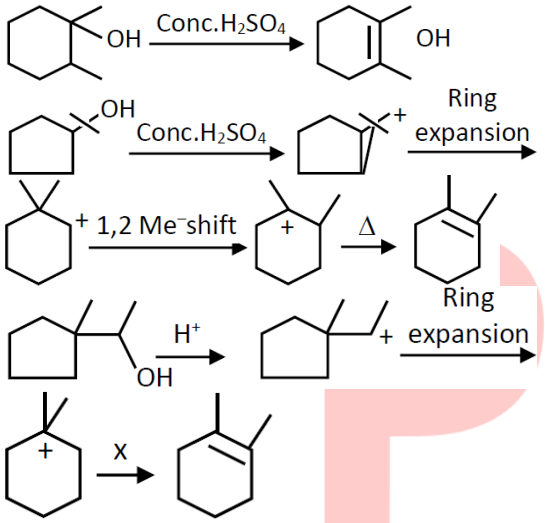
23. 3

Sol. $C_2H_5OH \xrightarrow[\text{Iodoform test}]{NaOH/I_2} CHI_3$ (yellow ppt)

$CH_3OH \xrightarrow{NaOH/I_2}$ No ppt

24. 3

Sol.

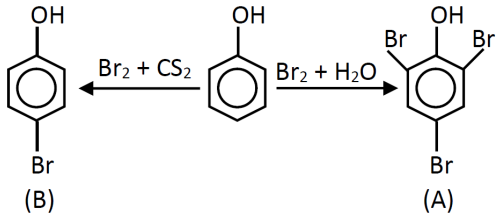


25. 2

Sol. Reimer-Tiemann reaction can be show phenol and it's derivative.

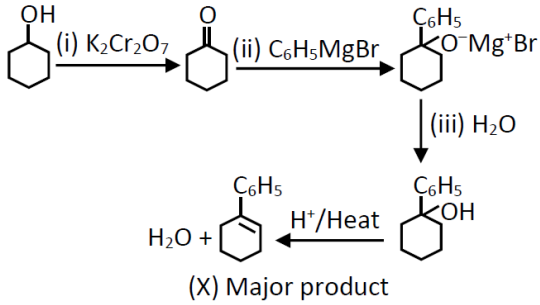
26. 4

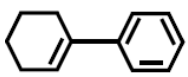
Sol.



27. 8

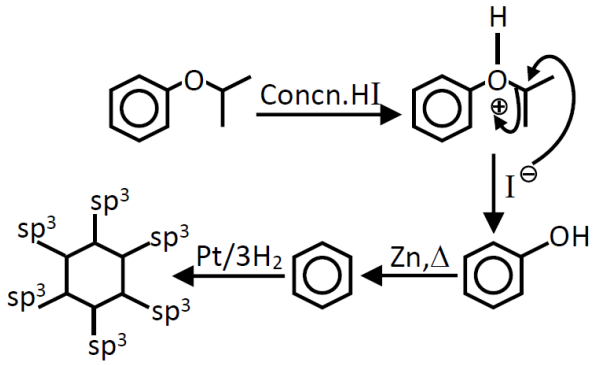
Sol.



The number of sp^2 hybridised carbon atom is 8 

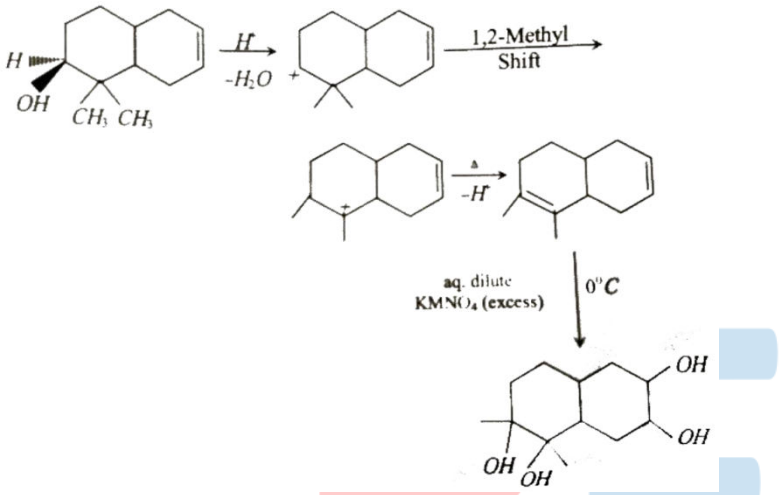
28. 6

Sol.



29. 4

Sol.



30. 3

Sol. $-NO_2$, –CHO, E.W. group.