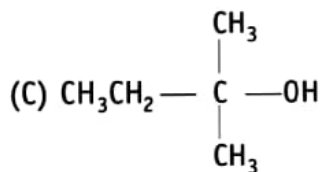
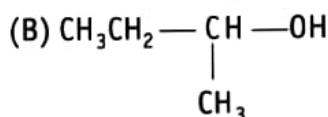
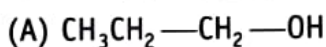


1. The order of reactivity of following alcohols with halogen acids is .....



(a) (A) > (B) > (C)

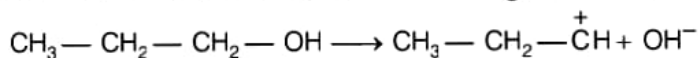
(b) (C) > (B) > (A)

(c) (B) > (A) > (C)

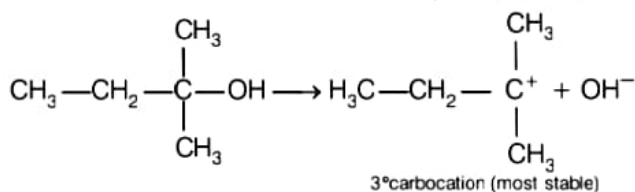
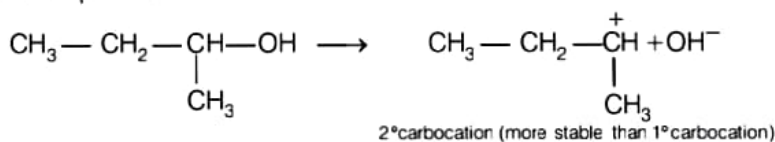
(d) (A) > (C) > (B)

(b) Reaction between alcohols and halogen acid follows  $\text{S}_{\text{N}}1$  mechanism. In  $\text{S}_{\text{N}}1$  mechanism carbocations are formed as intermediates.

Let us consider the formation of carbocations with the given three alcohols.

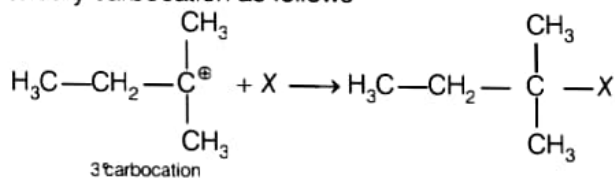


In this case,  $1^\circ$  carbocation is formed. It is least stable. So, here  $\text{S}_{\text{N}}2$  mechanism is followed. In this  $\text{S}_{\text{N}}2$  mechanism a transitory state is observed in  $\alpha$ -carbon is linked with two nucleophiles.



The reaction proceeded with stable carbocation. Higher the stability of carbocation, higher will be the possibilities of attack of  $\text{X}^-$  ion to the carbocation.

As, the tertiary carbocation is most stable so the possibilities of attack of  $\text{X}^-$  ion are more prominent in case of tertiary carbocations. Thus, attack of  $\text{X}^-$  ion to carbocation is proceeded with tertiary carbocation as follows



So, the correct option is (b).

**Note** Higher the stability of intermediate, higher will be the reactivity of compound and higher will be the yield of the desired product.