

Figure 3.14. The pH-activity profiles of two enzymes. (A) approximate activity for trypsin; (B) approximate activity for cholinesterase.

ity decreases with temperature because of enzyme denaturation. Figure 3.15 depicts the variation of reaction rate with temperature and the presence of an optimal temperature. The ascending part of Fig. 3.15 is known as *temperature activation*. The rate varies according to the Arrhenius equation in this region.

$$v = k_2 [E] \quad (3.46a)$$

$$k_2 = Ae^{-E_a/RT} \quad (3.46b)$$

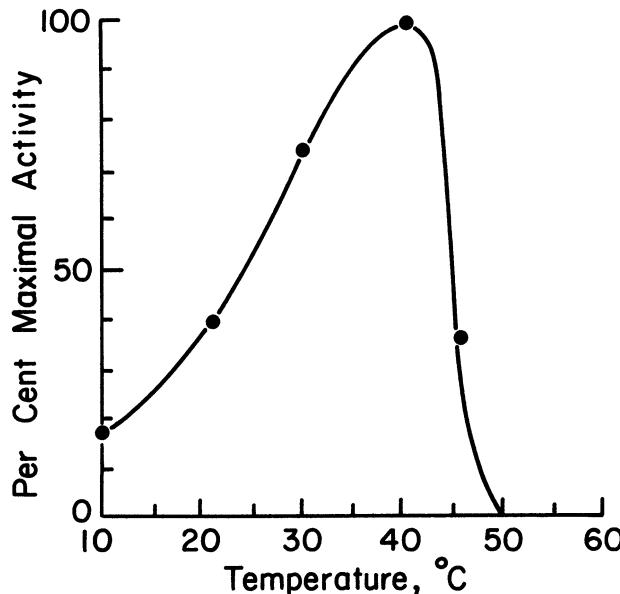


Figure 3.15. Effect of temperature on the activity of an enzyme. Here we have assumed a value of $E_a = 11 \text{ kcal/g-mol}$ and $E_d = 70 \text{ kcal/g-mol}$. The descending portion of the curve is due to thermal denaturation and is calculated assuming a 10-min exposure to the temperature. Note that the nature of the plot will depend on the length of time the reaction mixture is exposed to the test temperature.