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Quiz (Energy Profile)

Consider the reaction between propanone and iodine:

$$CH_3COCH_3(aq) + I_2(aq)$$
 $\xrightarrow{H^+(aq)}$ $CH_3COCH_2I(aq) + HI(aq)$ $\Delta H = +ve$

Draw the following energy profiles:

(a) One-step reaction:
$$CH_3COCH_3(aq) + I_2(aq) \longrightarrow CH_3COCH_2(aq) + HI(aq)$$

(b) Two-step reaction: Mechanism 1

$$CH_3COCH_3 + H^+ \longrightarrow intermediate$$
 (slow)
 $intermediate + I_2 \longrightarrow products$ (fast)

(c) Two-step reaction: Mechanism 2

$$CH_3COCH_3 + I_2 \longrightarrow intermediate$$
 (fast)
 $intermediate + H^+ \longrightarrow products$ (slow)

$$CH_3COCH_3 + I_2 \longrightarrow intermediate 1$$
 (fast)
intermediate 1 — intermediate 2 (slow)
intermediate 2 — intermediate 3 (fast)
intermediate 3 — products (fast)