2025 Ch H1 Q20

Section: Chemistry in Society

Topic: Chemical Energy (Reaction Yields)

Question summary

A two-step reaction produces intermediate B in step 1 and final product C in step 2. Step 1 yield = 50%, overall yield = 40%. Find the yield for step 2.

Worked solution

Let the theoretical amount of product C be 100 units.

Step 1 yield = 50%, so 50 units of intermediate B are produced.

Step 2 yield = (overall yield ÷ step 1 yield) × 100.

Step 2 yield = (40 ÷ 50) × 100 = 80%.

Therefore, the yield for step 2 is 80%.

Final answer

C. 80%

Revision tips

- Overall yield = (step 1 yield × step 2 yield) ÷ 100.

- To find one stage's yield, divide the overall yield by the other stage's yield and multiply by 100.

- Improving the lowest-yielding step gives the greatest increase in total yield.