Temperature and Equilibrium

New Regents original practice • Name: _____ Date: _____
Show your work for written answers.

In this model, A ⇌ B + heat represents an exothermic forward reaction. The reverse reaction absorbs heat.

1 Which direction absorbs heat in the model?

(1) Forward

(2) Reverse

(3) Both directions release heat.

(4) Neither direction involves heat.

2 The model starts at equilibrium. Explain why warming favors net formation of A until a new equilibrium is reached. [1]

Answer and work

3 Which change favors net production of B in the model?

(1) Increase temperature.

(2) Decrease temperature.

(3) Keep every condition the same.

(4) Stop counting particles.

4 After a temperature change, how do the forward and reverse rates compare once the system reaches equilibrium again? [1]

Answer and work

Comparing Equilibrium Compositions

Use the information below to answer the questions.

A sealed model contains A and B with the same total particle count in every run. It follows A ⇌ B + heat. The table gives particle counts after equilibrium is reached at each temperature.

Temperature (K)	A particles	B particles
300	20	80
350	35	65
400	50	50

5 At which listed temperature is the equilibrium count of B greatest?

(1) 300 K

(2) 350 K

(3) 400 K

(4) It is equal at all three.

6 Calculate the change in the equilibrium count of B from 300 K to 400 K. Include the sign. [1]

Answer and work

7 Which is the highest listed temperature that still leaves at least 65 B particles?

(1) 300 K

(2) 350 K

(3) 400 K

(4) No temperature meets the requirement.

8 Use the model and the measured counts to explain which net direction warming favors. [1]

Answer and work