Concentration Changes at Equilibrium

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

In the models below, the reversible reaction A + B ⇌ C is initially at equilibrium. Use the written equation to identify which direction consumes or produces each substance.

1 If A is added at constant volume and temperature, which direction tends to consume some of the added A?

(1) The forward direction

(2) The reverse direction

(3) Neither direction can consume A.

(4) Both directions consume A.

2 Some C is removed from a system at equilibrium. Explain which direction can replenish some C. [1]

Answer and work

3 Which change tends to favor the reverse direction in this model?

(1) Add A.

(2) Add B.

(3) Add C.

(4) Remove C.

4 Explain how the forward and reverse rates compare once the disturbed system reaches a new equilibrium. [1]

Answer and work

Recording a Concentration Disturbance

Use the information below to answer the questions.

A simulation changes one substance at constant temperature and volume. Each run starts at the same equilibrium. The table gives the rates at which C particles form in the forward reaction and are consumed in the reverse reaction immediately after the change.

Run	Change	Forward rate (particles/min)	Reverse rate (particles/min)
P	Add A	12	8
Q	Add C	8	13
R	Remove B	4	8

5 In which runs does the net change immediately favor the reverse reaction?

(1) P only

(2) P and Q

(3) Q and R

(4) All three

6 Calculate the net rate of C production in run P immediately after the change. Use the two listed rates. [1]

Answer and work

7 Use run R’s rates to explain why some B can be produced after B is removed. [1]

Answer and work

8 Which condition identifies a new equilibrium in Q?

(1) C returns to exactly its original amount.

(2) Both rates become zero.

(3) Forward and reverse rates become equal.

(4) The amount of C becomes equal to the amount of A.