Exothermic and Endothermic Reactions

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

The reacting substances are the system. A positive q for the system means heat enters it. A negative q means heat leaves it.

1 Which statement describes an exothermic reaction?

(1) Heat leaves the reacting system.

(2) Heat always enters the reacting system.

(3) No heat is transferred.

(4) The reacting system gains exactly one proton.

2 A reaction draws heat from a surrounding water bath. Explain the sign of q for the reaction system and the expected change in the bath temperature. [1]

Answer and work

3 Which sign represents heat released by the system?

(1) Positive

(2) Negative

(3) Zero

(4) Either sign is equally appropriate.

4 A reaction releases 240 J to an insulated water bath. Give q for the reaction and q for the bath. [1]

Answer and work

Reading Insulated Water Baths

Use the information below to answer the questions.

A model places a sealed reaction vial in a water bath. Assume heat flows only between the reacting system and the bath, and the vial stores negligible heat. Each bath has the same mass.

Trial	Initial bath temperature (°C)	Final bath temperature (°C)
P	22.0	26.0
Q	22.0	19.0
R	22.0	23.0

5 Which reaction is endothermic based on the bath readings?

(1) P

(2) Q

(3) R

(4) All three

6 Calculate ΔT for the bath in P, including the sign. [1]

Answer and work

7 Which trial shows the greatest heat gain by its water bath?

(1) P

(2) Q

(3) R

(4) All three have equal heat gain.

8 A student calls P endothermic because the bath got warmer. Explain how identifying the system resolves the mistake. [1]

Answer and work