Boiling Point and Particle Attractions

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

At a given pressure, a liquid boils when its vapor pressure reaches that pressure. The normal boiling point is measured at 1 atm.

1 Which condition makes two normal boiling-point measurements comparable?

(1) Both samples must be measured at 1 atm.

(2) Both samples must have identical colors.

(3) Both samples must have the same boiling point.

(4) Both samples must use the same molecular formula.

2 When a pure molecular liquid boils, explain which attractions are overcome and which bonds remain in the molecules. [1]

Answer and work

3 For two similar molecular substances at the same pressure, which generally has the higher boiling point?

(1) The substance with stronger intermolecular attractions

(2) The substance with weaker intermolecular attractions

(3) The substance with fewer grams in the sample

(4) The substance that was poured first

4 A liquid boils at a lower temperature when external pressure decreases. Explain why in terms of vapor pressure. [1]

Answer and work

Comparing Model Liquid Samples

Use the information below to answer the questions.

A lab compares three modeled liquids with similar molar masses under the same external pressure. Use the boiling points as evidence about the relative attractions between their molecules.

Liquid	**Normal boiling point (°C)**
P	46
Q	70
R	92

5 Which liquid reaches its boiling point at the lowest temperature at 1 atm?

(1) P

(2) Q

(3) R

(4) All three reach it together.

6 How much higher is R’s normal boiling point than Q’s? Show the calculation. [1]

Answer and work

7 Use the table to support a comparison of intermolecular attractions in P and R. [1]

Answer and work

8 Which additional comparison would make it harder to use boiling points to compare attractions?

(1) Measure at the same pressure.

(2) Verify each sample is pure.

(3) Measure the samples at different external pressures.

(4) Use the same thermometer calibration.