Evaporation and Vapor Pressure

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

In a closed vessel at a fixed temperature, a liquid and its vapor can reach dynamic equilibrium. Vapor pressure is the pressure of the vapor at that equilibrium.

1 Where do particles leave the liquid during evaporation below its boiling point?

(1) Throughout the liquid as large bubbles

(2) At the liquid surface

(3) Only at the bottom

(4) Only inside the vessel walls

2 In a closed vessel at equilibrium, the amount of liquid stays constant. Explain how evaporation and condensation can still occur. [1]

Answer and work

3 Which condition allows a pure liquid to boil at a specified external pressure?

(1) Its vapor pressure equals the external pressure.

(2) Its vapor pressure falls to zero.

(3) Its mass becomes equal to the mass of the vessel.

(4) Its surface area becomes zero.

4 Explain why increasing temperature generally increases a liquid’s vapor pressure. [1]

Answer and work

Comparing Two Model Liquids

Use the information below to answer the questions.

A lab records equilibrium vapor pressures of two modeled liquids at different temperatures.

Temperature (°C)	Liquid P vapor pressure (kPa)	Liquid Q vapor pressure (kPa)
20	12	5
40	30	14
60	60	35

5 At 40 °C, which liquid has the higher vapor pressure?

(1) P

(2) Q

(3) Both are equal.

(4) Neither has vapor at 40 °C.

6 By how many kilopascals does Q’s vapor pressure increase from 20 °C to 60 °C? [1]

Answer and work

7 At an external pressure of 60 kPa, which liquid is at its boiling point at 60 °C?

(1) P only

(2) Q only

(3) Both liquids

(4) Neither liquid

8 Explain why comparing these liquids at the same temperature matters when using the data to compare their tendencies to enter the vapor phase. [1]

Answer and work