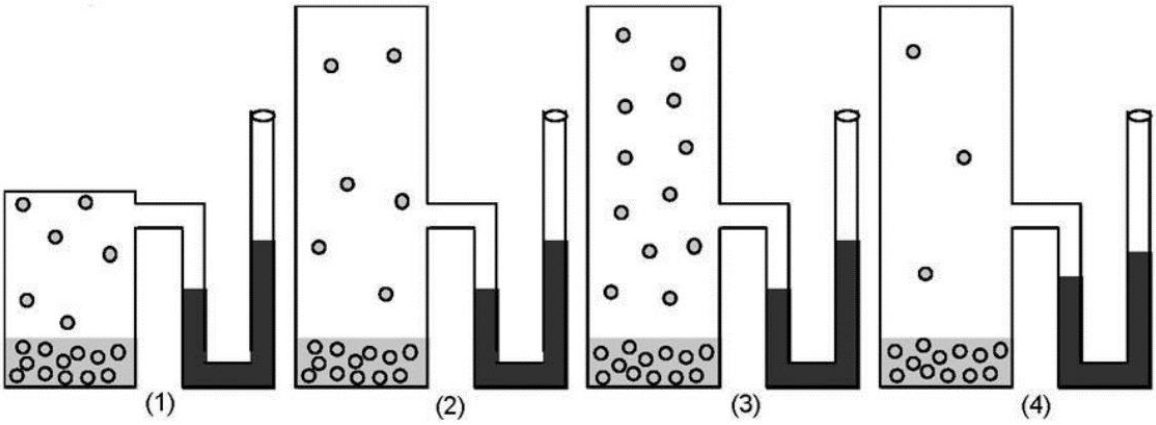
Recitation Worksheet 1 (9/1/2020)

Name: UGA ID:

Instructions:

- Please enter your first and last name as it appears on the eLC roster (do not use a nickname).
- Your UGA myID is a combination of letters and numbers (example: mine is sre13137). **Do not use your 81x number.**
- If you do not have a printer, type your answers in the then upload the worksheet template to Gradescope by Tuesday, September 1 at 11:59 p.m. Write your work on separate sheets of paper, convert to a PDF and upload to eLC.
- If you have a printer download the worksheet, convert it to a PDF and upload to Gradescope by Tuesday, September 1 at 11:59 p.m. You do not need to upload anything to eLC.
- For full credit, **show your work.**

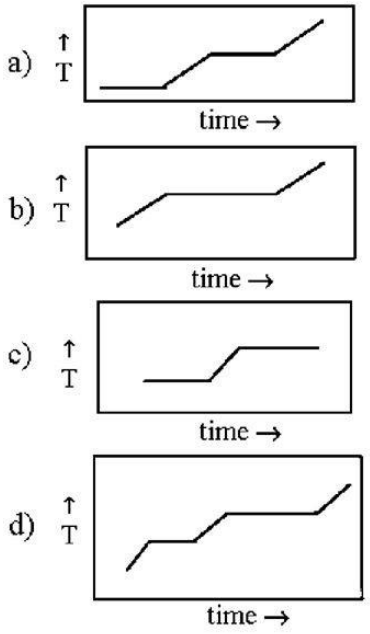
1. If figure (1) represents the vapor pressure of water at 25 °C in a 1-liter container, which figure represents the vapor pressure of water at 25 °C in a 2-liter container?



2. When a substance melts at its normal melting point, the sign of Δ*H* is _____ and the sign of Δ*S* of this phase change is _____.

A. +, −
B. −, +
C. +, +
D. −, −

3. Consider a compound that undergoes sublimation at 125 °C and a pressure of one atm. Which of the heating curves (shown at right) would be appropriate for heating the compound from 100 °C to 150 °C?



4. How much heat is released when 125.0 g of steam at 100.0°C is cooled to ice at −15.0°C? The enthalpy of vaporization of water is 40.67 kJ/mol, the enthalpy of fusion for water is 6.01 kJ/mol, the molar heat capacity of liquid water is 75.4 J/(mol · °C), and the molar heat capacity of ice is 36.4 J/(mol · °C).

kJ

5. According to the phase diagram given for Compound Y, what description is **correct**?

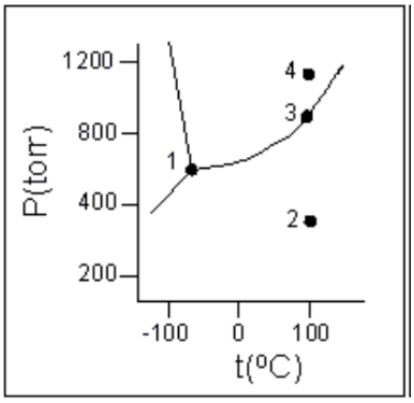
A. At the temperature and pressure at point 4, Y(g) will spontaneously convert to Y(*l*).

B. At 0 °C and 1200 torr, Y exists as a solid.

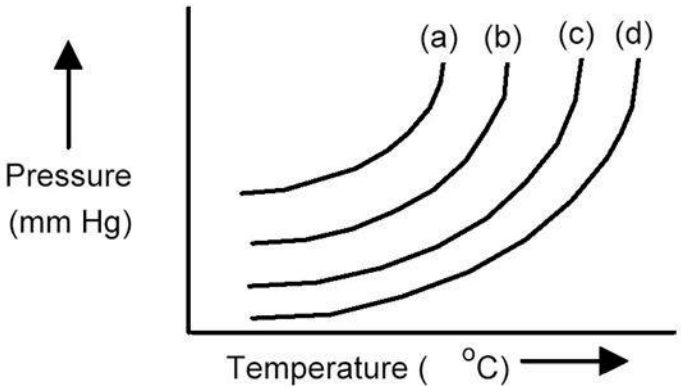
C. At the pressure and temperature of point 1, Y(s) will spontaneously convert to Y(g) and no Y(*l*) is possible.

D. At the pressure and temperature at point 3, Y(s) ⇋ Y(g).

E. At the temperature and pressure at point 2, Y(*l*) ⇋ Y(g)



6. The plots below represent vapor pressure vs. temperature curves for diethyl ether ($CH_3CH_2OCH_2CH_3$), ethanol (CH_3CH_2OH), mercury, and water, not necessarily in that order. Based on the relative strengths of the intermolecular forces of attraction of each substance, which is the most likely vapor pressure vs. temperature curve for diethyl ether?



7. Determine the normal boiling point, in Kelvin, of a substance whose vapor pressure is 55.1 mm Hg at 35 °C and has a ΔH_{vap} of 32.1 kJ/mol.

[ ] K

8. How much energy must be removed from a 125 g sample of benzene (molar mass= 78.11 g/mol) at 425.0 K to liquify the sample and lower the temperature to 335.0 K? The physical data below may be useful.

ΔH_{vap} = 33.9 kJ/mol
ΔH_{fus} = 9.8 kJ/mol
C_{liq} = 1.73 J/g°C
C_{gas} = 1.06 J/g°C
C_{sol} = 1.51 J/g°C
$T_{melting}$ = 279.0 K
$T_{boiling}$ = 353.0 K

[ ] kJ

9. What is the strongest type of intermolecular force present in CH_2F_2?

[ ]

10. Choose the molecule or compound that exhibits dispersion forces as its strongest intermolecular force.

[ ]

A. O_2
B. CO
C. HF
D. NaCl
E. All of these have intermolecular forces stronger than dispersion.