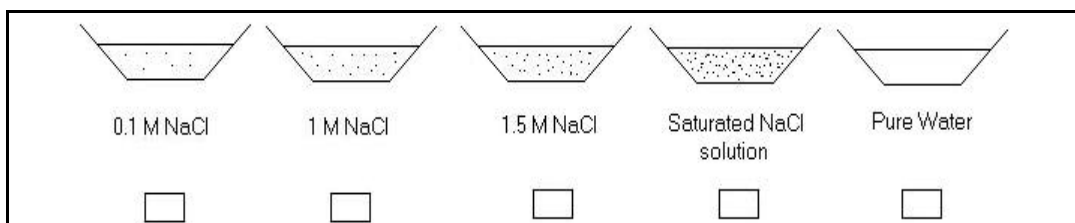


PHASE EQUILIBRIUM CONCEPT TEST

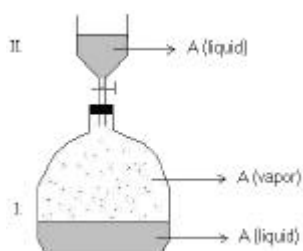
Question 1

At 1 atm and 25°C, the vapor pressure of pure water is 23.8 torr. In the following figure, four aqueous solutions of NaCl at different concentrations and pure water have been shown. Which one has the lowest vapor pressure?



Explain the reason of your answer as detailed as possible:

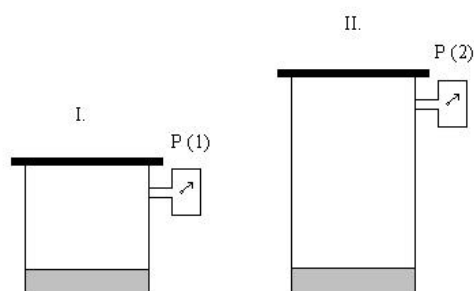
Question 2



The figure shows a container which consists of two parts, part I and part II, containing the same liquid. In flask I liquid A is in equilibrium with its vapor. By opening the valve of flask II some amount of liquid A is added into the flask I and then the valve is turned off. After a while the equilibrium vapor pressure in flask I is measured. Compare the equilibrium vapor pressure values measured before and after adding liquid. Are they equal or not?

Explain the reason of your answer as detailed as possible:

Question 3



There are two vessels, both of which contain 1 L of ethyl alcohol. The volumes of the vessel I and II are 5 and 10 L, respectively. The vapor pressures of the liquid in the both vessels are measured. Compare the vapor pressures in the two vessels.

Explain the reason of your answer as detailed as possible:

Question 4

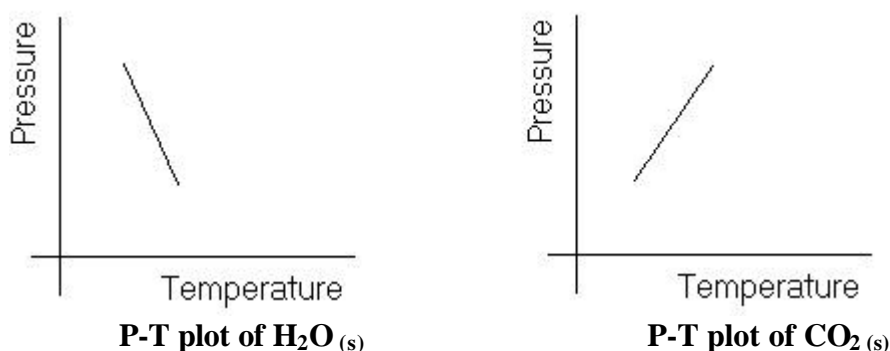
In an underground cellar which is 50 m in deep from the sea level, the liquids of H_2O and CS_2 are boiled in different kettles. What can be said about their vapor pressures at the moment of boiling?

- Vapor pressure over the kettle containing water is higher
- Vapor pressure over the kettle containing CS_2 is higher
- Both of them are the same

Explain the reason of your answer as detailed as possible:

Question 5

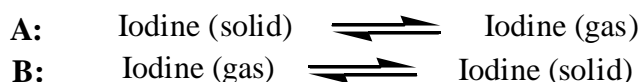
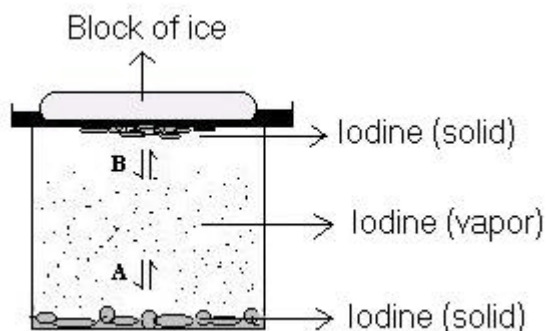
A liquid film must be formed under the skates because of the pressure created by the weight of the skater's body so that s/he can skate. The phase diagrammes of H_2O and CO_2 (dry ice) as pressure-vs-temperature plots are given in the figure. By considering these diagrammes, on which skating field made of ice or dry ice do you expect a skater can skate more easily?



Explain the reason of your answer as detailed as possible:

Question 6

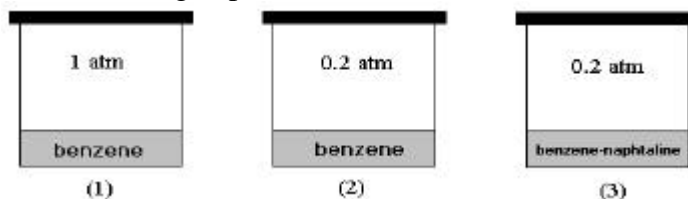
What do the processes A and B in the following figure describe?



- a) The process A is a
- b) The process B is a

Question 7

As shown in the following figure, there are three different chambers of pressure. The first chamber contains pure benzene under 1 atm pressure, the second pure benzene under 0.2 atm, the third benzene containing naphthalene dissolved under 0.2 atm.



Put these samples in an order according to their freezing points.

Explain the reason of your answer as detailed as possible:

Question 8

When sulfur(S) is added into benzene, the boiling temperature of benzene increases. When CS₂(liquid) is added into benzene, how does the boiling temperature of the solution change? Boiling points of CS₂ and benzene are 319.35 K and 353.25 K, respectively.

Explain the reason of your answer as detailed as possible: