A solution of hydrogen peroxide is 45.0% by mass H_2O_2 (Molar mass 34.0 g/mol) and has a density of 1.09 g/cm^3. The molarity of the solution is:

Select one:

a.
14.4 M

b.
5.77 M

c.
7.05 M

d.
8.34 M

e.
9.62 M

① molarity = $\frac{\text{moles}}{\text{volume}}$

$\rho = 1.09 \frac{g}{cm^3} \times 1000 cm^3 = 1090\ g$

mass of $H_2O_2 = \frac{45\% \times 1090}{100\%} = 490.5\ g$

$\text{mdes of } H_2O_2 = \frac{m}{m.m} = \frac{490.5}{34} = 14.43$

$\text{molarity} = \frac{14.43}{1.0\ L} = 14.43\ M$ A

A 0.580 M solution of $CaCl_2$ contains 1.10 g (Molar mass 110.9 g/mol) of solute, what ?is the volume

اخترأحد الخيارات

a. mL 19.9

b. mL 45.1

c. mL 38.9

d. mL 17.1

e. mL 54.4

② moles of $CaCl_2 = \frac{1.10\ g}{110.9\ g/mol} = 9.92 \times 10^{-3}$

0.580 mole $CaCl_2$ → 1000 mL

1 mole $CaCl_2$ → ~~x~~ ~~= 1724.14 mL~~

9.92×10^{-3} mole $CaCl_2$ → X

X = 17.1 mL [d]

The enthalpy of fusion of aluminum is 10.7 kJ/mol (Molar mass=27.0g/mol). How many grams of aluminum can be melted by adding 77.3 kJ of energy to the metal at its melting point?

Select one:

a.
313 g

b.
439 g

c.
205 g

d.
153 g

e.
195 g

③ 1 mol → 10.7 kJ

27 g → 10.7 kJ

10.7 kJ → 27 g

77.3 kJ → X g

X = 1959 g

E

The boiling point of a liquid is:

اختر أحد الخيارات

a. The temperature at which the vapor pressure equals the pressure exerted on the liquid

b. The temperature at which the liquid phase of a substance is in equilibrium with the vapor phase

c. The temperature at which the vapor pressure equals 760 mmHg (1 atm).

d.

The answer is B

What is the name for the following phase ?change

$$I_2(l) \rightarrow I_2(g)$$

اختر أحد الخيارات

a. Condensation

b. Vaporization

c. Sublimation

d. Freezing

e. Melting

The answer is B

Clear my choice

A liquid has an enthalpy of vaporization of 155 kJ/mol. At 274 K, it has a vapor pressure of 103 mmHg. What is the normal boiling point of this liquid? (R = 8.314 J/K· mol)

Select one:

- a. 315 K
- b. 325 K
- c. 289 K
- d. 282 K
- e. 293 K

⑥ $T_1 = 274$ // $P_1 = 103\ mmHg$ // $P_2 = 760\ mmHg$

$\Delta H = 155\ KJ/mol = 155 \times 10^3\ J/mol$ (P at normal bP)

$$\ln\left(\frac{P_2}{P_1}\right) = \left(\frac{\Delta H}{R}\right) X \left(\frac{1}{T_1} - \frac{1}{T_2}\right)$$

$$= \ln\left(\frac{7.6 \times 10^4}{1.03 \times 10^4}\right) = \frac{155 \times 10^3}{8.314} X \left(\frac{1}{274} - \frac{1}{T_2}\right)$$

$$T_2 = 282.29 \approx 282k$$ (d)

:All of the following are colligative properties except

اختر أحد الخيارات

a. vapor pressure lowering

b. freezing point depression

c. osmotic pressure

d. density elevation

e. boiling point elevation

The answer is D

Calculate the molarity of a solution containing KCl and water whose osmotic pressure at 21°C is 80.1 torr. Assume complete dissociation of the salt. (R = 0.0821 $L.atm.mol^{-1}.K^{-1}$)

اختر أحد الخيارات

a. M 0.00330

b. M 0.00246

c. M 0.00191

d. M 0.00218

e. M 0.00275

⑧ Osmotic P $\pi = iMRT$

$i = 2$ → since KCl dissociates in two ions

$T = 21 + 273 = 294\ K$

$P = 80.1$ torr or 80.1 mmHg (1 torr = 1 mmHg)

1 atm = 760 mmHg

atm = 80.1 mmHg P = 0.105 atm

* Molarity $= \frac{\pi}{iRT} = \frac{0.105\ atm}{2 \times 0.0821 \times 294}$

$= 0.00218 \frac{mol}{L} = 0.00218\ M$ (d)

The measure of the resistance to the flow of a liquid is

Select one:

a. London forces.

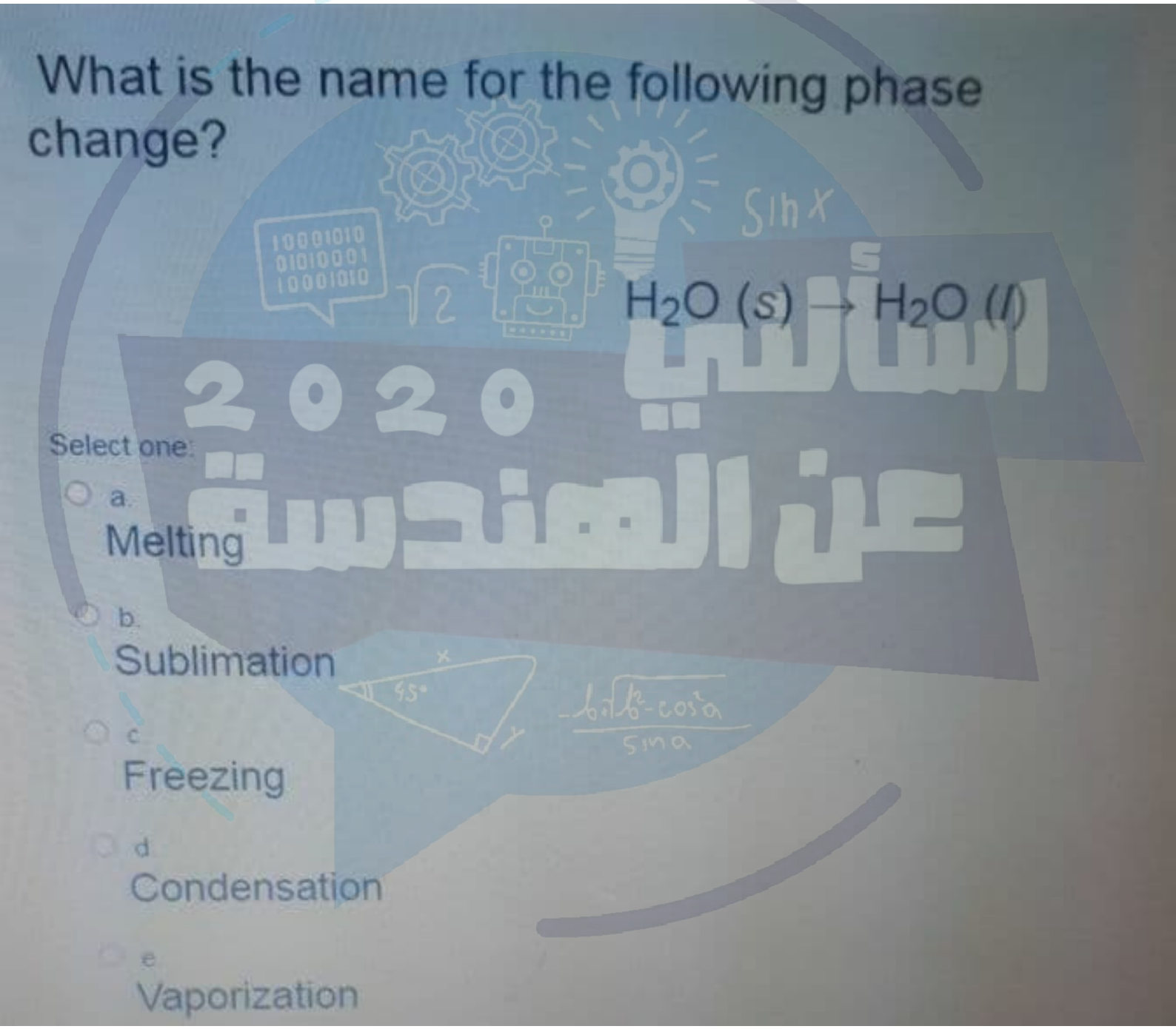
b. van der Waals forces.

c. vapor pressure.

d. surface tension.

e. viscosity.

The answer is E



The answer is A

What is the molality of a solution of 30.0 g of propanol (C3H7OH, molar mass 60.1 g/mol) in 152 mL water, if the density of water is 1.00 g/mL?

Select one:

a.
5.47 m

b.
2.63 m

c.
3.28 m

d.
1.64 m

(11) $\rho_{water} = 1\ g/mL$ $mm = 60.1$ $mass = 30$

$V = 152\ m$

$\rho = \frac{m}{V}$ mass of water $= 152 \times 10^{-3}\ kg$

moles of Propanol $= \frac{m}{m.m} = \frac{30}{60.1} = 0.499$

≈ 0.5 moles

molarity $= \frac{0.5}{152 \times 10^{-3}\ kg} = 3.28\ m$ (C)

When a 32.0 g sample of an unknown compound is dissolved in 500. g of benzene, the freezing point of the resulting solution is 3.77°C. The freezing point of pure benzene is 5.48°C and *K*f for benzene is 5.12°C/m. **Calculate the molar mass of the unknown compound**

Select one:

a.
192. g/mol

b.
120. g/mol

c.
132. g/mol

d.
102. g/mol

(12) $dT = Kf^{a}\ m$ $\quad dT = 5.48 - 3.77 = 1.71$

molality of solution, $m = dT / Kf \rightarrow 1.71^{c} / 5.12\ \frac{^{c}}{m}$

$= 0.334\ m$ $\quad$ (Kf: const)

$m = \dfrac{\text{mass / molar mass}}{0.5\ kg} \Rightarrow$ [redacted]

$0.334 = \dfrac{\text{moles}}{0.5}$ $\quad$ moles $= 0.167$ moles

$0.167 = \dfrac{32.6}{m.m}$ $\quad m.m = 192\ g/mol$

(a)

Which of The following compounds has the highest vapor pressure at 25°C?

اختر أحد الخيارات

a. $CH_3CH_2CH_2Cl$

b. $CH_3CH_2CH_3$

c. CH_3CH_2OH

d. CH_3OCH_3

e. $CH_3CH_2CH_2CH_3$

The answer is B

What is the boiling point change for a solution containing 0.282 moles of naphthalene (a nonvolatile, nonionizing compound) in 220. g of liquid benzene? (K_b = 2.53°C/m for benzene)

Select one:

- a. 1.81°C
- b. 1.48°C
- c. 3.24°C
- d. 2.54°C
- e. 2.91°C

(12) $\Delta T_F = K_b \cdot m$ $K_F = K_b = 2.53$

mass of benzene = 220g = 0.220 kg

$m = 0.282 / 0.220$ $m = 1.28$

$\Delta T_F = 2.53 \times 1.28$

$\Delta T_F = 3.24^{\circ}C$ C