Solutions

Q.No.1: The vapour pressure of acetone at 20°C is 185 torr. When 1.2 g of a non − volatile substance was dissolved in 100 g of acetone at 20°C, its vapour pressure was 183 torr. The molar mass (g mol^{-1}) **JEE 2015**

A. 32
B. 64
C. 128
D. 488

Q.No.2: For 1 molal aqueous solution of the following compounds, which one will show the highest freezing point? **JEE 2018**

A. $[Co(H_2O)_4Cl_2]Cl.2H_2O$
B. $[Co(H_2O)_3Cl_3].3H_2O$
C. $[Co(H_2O)_6]Cl_3$
D. $[Co(H_2O)_5Cl]Cl_2.H_2O$

Q.No.3: A solution of sodium sulfate contains 92 g of Na^+ ions per kilogram of water. The molality of Na^+ ions in that solution in mol kg^{-1} is: **JEE 2019**

A. 12
B. 4
C. 8
D. 16

Q.No.4: Which one of the following statements regarding Henry's law is not correct? **JEE 2019**

A. Higher the value of K_H at a given pressure, higher is the solubility of the gas in the liquids.
B. Different gases have different K_H (Henry's law constant) values at the

same temperature.

C. The partial pressure of the gas in vapour phase is proportional to the mole fraction of the gas in the solution.

D. The value of K_H increases with increase of temperature and K_H is function of the nature of the gas

Q.No.5: For the following reaction, the mass of water produced from 445 g of $C_{57}H_{110}O_6$ is:

$2C_{57}H_{110}O_6(s) + 163\ O_2(g) \rightarrow 114CO_2(g) + 110H_2O(l)$ **JEE 2019**

A. 490 g

B. 445 g

C. 495 g

D. 890 g

Q.No.6: A solution containing 62 g ethylene glycol in 250 g water is cooled to –10 °C. If K_f for water is 1.86 K kg mol^{-1}, the amount of water (in g) separated as ice is: **JEE 2019**

A. 48

B. 32

C. 64

D. 16

Q.No.7: Liquids A and B form an ideal solution in the entire composition range. At 350 K, the vapour pressure of pure A and pure B are 7×10^3 Pa and 12×10^3 Pa, respectively. The composition of the vapour in equilibrium with a solution containing 40 mole percent of A at this temperature is: **JEE 2019**

A. $x_A = 0.37$; $x_B = 0.63$

B. $x_A = 0.28$; $x_B = 0.72$

C. $x_A = 0.4$; $x_B = 0.6$

D. $x_A = 0.76$; $x_B = 0.24$

Q.No.8: The amount of sugar ($C_{12}H_{22}O_{11}$) required to prepare 2 L of its 0.1 M aqueous solution is: **JEE 2019**

A. 136.8 g

B. 17.1 g

C. 68.4 g

D. 34.2 g

Q.No.9: Elevation in the boiling point for 1 molal solution of glucose is 2 K. The depression in the freezing point for 2 molal solution of glucose in the same solvent is 2 K. The relation between K_b and K_f is : **JEE 2019**

A. $K_b = 1.5\ K_f$

B. $K_b = K_f$

C. $K_b = 0.5\ K_f$

D. $K_b = 2\ K_f$

Q.No.10: The freezing point of a diluted milk sample is found to be –0.2 °C, while it should have been –0.5 °C for pure milk. How much water has been added to pure milk to make the diluted sample? **JEE 2019**

A. 1 cup of water to 2 cups of pure milk

B. 3 cups of water to 2 cups of pure milk

C. 1 cup of water to 3 cups of pure milk

D. 2 cups of water to 3 cups of pure milk