

Answer on Question#69960 – Chemistry – General chemistry

**Question:**

A solution is prepared by adding 35.00 g of lactose (milk sugar) to 110.0 g of water at The partial pressure of water above the solution is \_\_\_\_\_ torr. The vapor pressure of pure water at 55°C is 118.0 torr. The MW of lactose is

116.1

109.8

89.5

1.944

197.6

**Solution:**

The molar mass of lactose  $M = 342.3 \text{ g/mol}$ .

$$n(\text{lactose}) = \frac{35.00\text{g}}{342.3 \text{ g/mol}} = 0.1023 \text{ mol}$$

$$n(\text{water}) = \frac{110.0\text{g}}{18.02 \frac{\text{g}}{\text{mol}}} = 6.104 \text{ mol}$$

$$\text{mole fraction of water} = \frac{6.104\text{mol}}{0.1023 \text{ mol} + 6.104\text{mol}} = 0.9835$$

$$p = 0.9834 \times 118.0 \text{ torr} = 116.1 \text{ torr}$$

**Answer:** 116.1 torr