

Answer on Question #76685 – Chemistry – Other

Task:

What mass of dextrose, C₆H₁₂O₆ is dissolved in 325 mL of 0.258 M solution?

Solution:

We are given the concentration (0.258 M = 0.258 mol·L⁻¹).

Using a periodic table, we find the molar mass of C₆H₁₂O₆:

$$M(C_6H_{12}O_6) = 6 * Ar(C) + 12 * Ar(H) + 6 * Ar(O);$$

$$M(C_6H_{12}O_6) = 6 * 12.0107 + 12 * 1.00794 + 6 * 15.999 = 180.15348 \frac{g}{mol}.$$

$$M(C_6H_{12}O_6) \approx 180.15 \frac{g}{mol}$$

The molar mass of C₆H₁₂O₆ is 180.15 g·mol⁻¹.

We will convert 325 mL into 0.325 L.

$$C(X) = \frac{n(X)}{V(X)} = \frac{m(X)}{M(X) * V(X)} \Rightarrow m(X) = C(X) * M(X) * V(X)$$

Then,

$$m(C_6H_{12}O_6) = C(C_6H_{12}O_6) * M(C_6H_{12}O_6) * V(C_6H_{12}O_6);$$

$$m(C_6H_{12}O_6) = 0.258 \frac{mol}{L} * 180.15 \frac{g}{mol} * 0.325 L = 15.1056 g;$$

$$m(C_6H_{12}O_6) \approx 15.1 g$$

Answer: 15.1 g of dextrose will be required.