ANSWERS TO TOPIC C HOMEWORK

1) a) 538 torr b) 393 torr c) 1.05×10^3 mL d) 0.593 g

2) **C_8H_{12}**.

3) You should get 3.679×10^5 g as an unrounded value. This is a very rough approximation, because we have not subtracted the volume of the lab benches and other furniture, so our answer is probably only valid to one significant figure or roughly **4×10^5 grams** (400 kilograms). Reporting two significant figures would be reasonable also, if somewhat overoptimistic…

4) 111 torr

5) a) 1.21 g b) 0.661 atm

6) a) 0.0103 moles b) 0.663 g

7) a) 1.01×10^5 J (or 101 kJ) b) 6.42×10^{-21} J c) 6.07×10^{-21} J
d) 3.86 kJ/mol, 3.66 kJ/mol

8) 1.39×10^3 m/s.

9) The average speed of nitrogen molecules is the larger of the two.

10) Review the lecture notes for kinetic molecular theory of gases.

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a) **oxygen at 75ºC** is larger (see full key for explanation)
b) **they have the same most probable kinetic energies** (see full key for explanation)
c) **hydrogen** is larger (see full key for explanation)
d) the fraction of **CH_4 molecules** with velocities greater than 500 m/sec is larger (see full key for explanation)
e) **exactly the same fraction of atoms** with kinetic energies in any range we select (see full key for explanation)

12) Review the lecture notes for kinetic molecular theory of gases. This problem is not trivial, because both the molar mass and the temperature are different for each sample of gas. Curve A corresponds to the CO_2 at 25ºC, curve B corresponds to the Ne at 0ºC, and curve C corresponds to the H_2 at 50ºC.

13) Review the lecture notes for kinetic molecular theory of gases. (See the full solutions key for answer.)

14) **$Ni(CO)_4$**

15) a) 884 moles b) 152 atm *(You must look up the **a** and **b** variables in your textbook!)*