MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

1) How many grams of hydrogen are in 46 g of CH₄O?
   A) 2.8       B) 184       C) 0.36       D) 1.5       E) 5.8

2) How many moles of carbon dioxide are there in 52.06 g of carbon dioxide?
   A) 8.648 ×10²³  B) 0.8452  C) 3.134 ×10²⁵  D) 1.183  E) 6.022 ×10²³

3) There are __________ molecules of methane in 0.123 mol of methane (CH₄).
   A) 2.46 ×10⁻²  B) 7.40 ×10²²  C) 5  D) 0.615  E) 2.04 ×10⁻²⁵

4) The combustion of propane (C₃H₈) in the presence of excess oxygen yields CO₂ and H₂O:

   C₃H₈ (g) + 5O₂ (g) → 3CO₂ (g) + 4H₂O (g)

   When 2.5 mol of O₂ are consumed in their reaction, __________ mol of CO₂ are produced.
   A) 1.5       B) 2.5       C) 5.0       D) 6.0       E) 3.0

5) Calcium carbide (CaC₂) reacts with water to produce acetylene (C₂H₂):

   CaC₂ (s) + 2H₂O (g) → Ca(OH)₂ (s) + C₂H₂ (g)

   Production of 13 g of C₂H₂ requires consumption of __________ g of H₂O.
   A) 9.0       B) 18       C) 4.8 ×10²       D) 4.5       E) 4.8 ×10⁻²

6) What mass in grams of hydrogen is produced by the reaction of 4.73 g of magnesium with 1.83 g of water?

   Mg (s) + 2H₂O (l) → Mg(OH)₂ (s) + H₂ (g)

   A) 0.204       B) 0.0485       C) 0.0162       D) 0.219       E) 0.102
7) What is the maximum mass in grams of NH₃ that can be produced by the reaction of 1.0 g of N₂ with 3.0 g of H₂ via the equation below?

\[ \text{N}_2 (g) + \text{H}_2 (g) \rightarrow \text{NH}_3 (g) \] (not balanced)

A) 1.2  
B) 2.0  
C) 0.61  
D) 4.0  
E) 17

8) A sulfur oxide is 50.0% by mass sulfur. This molecular formula could be __________.

A) S₂O  
B) SO₂  
C) SO  
D) S₂O₄  
E) either SO₂ or S₂O₄

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

9) A compound was found to contain 90.6% lead (Pb) and 9.4% oxygen. The empirical formula for this compound is __________.

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

10) How many grams of CH₃OH must be added to water to prepare 150 mL of a solution that is 2.0 M CH₃OH?

A) 9.6  
B) 4.3  
C) 9.6 \times 10^3  
D) 2.4  
E) 4.3 \times 10^2

11) The concentration (M) of an aqueous methanol produced when 0.200 L of a 2.00 M solution was diluted to 0.800 L is __________.

A) 0.500  
B) 0.400  
C) 8.00  
D) 0.200  
E) 0.800