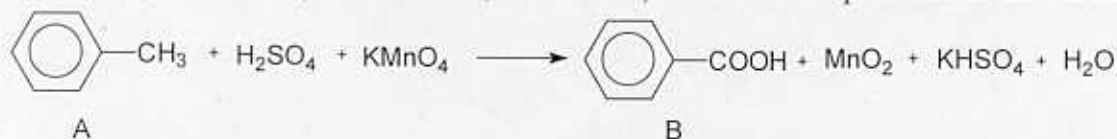
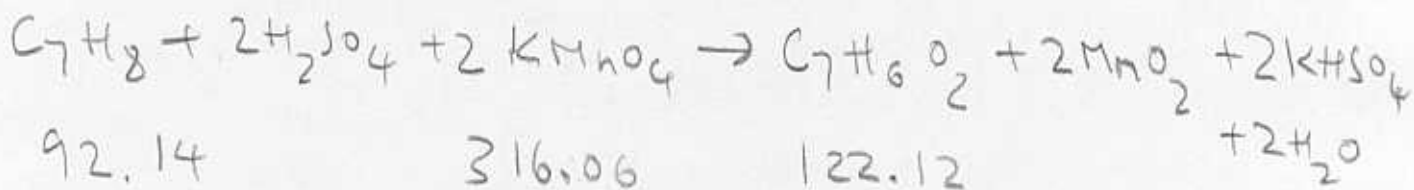


Ten grams of toluene (A) are oxidized with 36 g potassium permanganate in excess sulfuric acid. Four grams of benzoic acid (B) are isolated. (Atomic weights: C = 12.011, H = 1.008, S = 32.066, O = 16.000, Mn = 54.938, K = 39.098). The reaction proceeds as shown below:



1. Show a balanced reaction equation for this reaction. Use sum formulas. (3 pts).



2. What was the limiting reactant? Show your calculations! (2 pts).

$$\frac{10.0}{92.1} \times 316.1 = 34.3 \text{ g KMnO}_4 \text{ needed}$$

→ toluene is limited

3. How many grams theoretical yield do you expect for benzoic acid? Show your calculations! (3 pts).

$$\frac{10.0}{92.1} \times 122.2 = 13.3 \text{ g}$$

4. What % yield of theory was obtained? Show your calculations! (3 pts).

$$\frac{4.0}{13.3} \times 100 = 30.2\% \text{ , based on toluene}$$

5. Check all that apply! (4 pts)

Compound	flammable	corrosive
hexane	✓	
chloroform		