Chemistry 2.4 (2.1) **Worksheet 3** Name _____

Question One- Complete the table

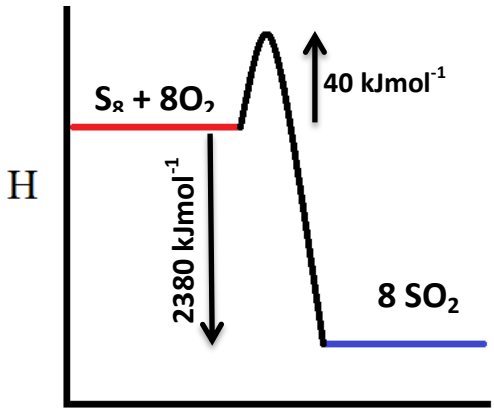
Reaction	Exo / endo	ΔH + / –
Burning sulfur	*Exothermic*	–
Water boiling	Endothermic	+
Photosynthesis	Endothermic	+
Respiration	Exothermic	–
Bond breaking	Endothermic	+
Bond making	Exothermic	–

Question Two

Burning sulfur is an exothermic reaction with an activation energy barrier of 40 kJ

$S_8 + 8\ O_2 \rightarrow 8\ SO_2 \qquad \Delta H = -2380\ kJmol^{-1}$

Draw a fully labelled energy profile of the reaction



Calculate the amount of energy released when 1.60 g of sulfur is burnt

1.60 g ÷ 256.8 $gmol^{-1}$ = 0.006231 mol of S_8

S_8 : reaction = 1 : 1

Amount of reaction = 0.006231 mol

0.006231 mol × 2380 $kJmol^{-1}$ = 14.8 kJ (3 s.f.)

<u>14.8 kJ</u> of energy is released when 1.60 g of sulfur is burnt

What is the mass of sulfur is needed to release 3400 kJ of energy?

3400 kJ ÷ 2380 $kJmol^{-1}$ = 1.428571 mol of reaction

reaction : S_8 = 1 : 1

Amount of S_8 = 1.428571 mol

1.428571 mol × 256.8 $gmol^{-1}$ = 367 g (3 s.f.)

<u>367 g</u> of sulfur is needed to release 3400 kJ of energy