

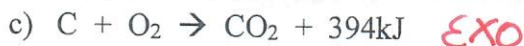
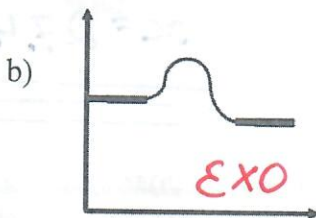
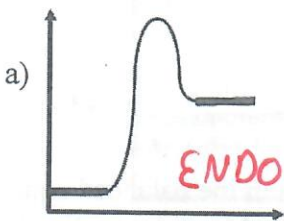
Exothermic/Endothermic Exercises:

name: SOLUTIONS

- 1) 'The overall quantity of energy released or absorbed by a chemical reaction can be determined by calculating its Net Reaction Energy.' Explain this statement:

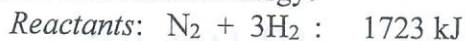
It is the difference between the energy absorbed by the reactants to break bonds, and the energy released by the products when new bonds are formed.

- 2) State whether the following is endothermic or exothermic:



- 3) Using the following synthesis equation for Ammonia $N_2 + 3H_2 \rightarrow 2NH_3$

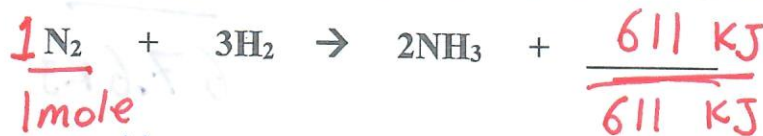
- a) Calculate the Net Reaction Energy:



Net Energy of Reaction: -611 kJ

- b) Is this above reaction exothermic or endothermic? EXO

- c) What quantity of energy would be produced if 50g of N_2 was used? (hint: stoichiometry)



1 mole
 $m = n \cdot M$

$m = 1(28)$

$m = 28g$

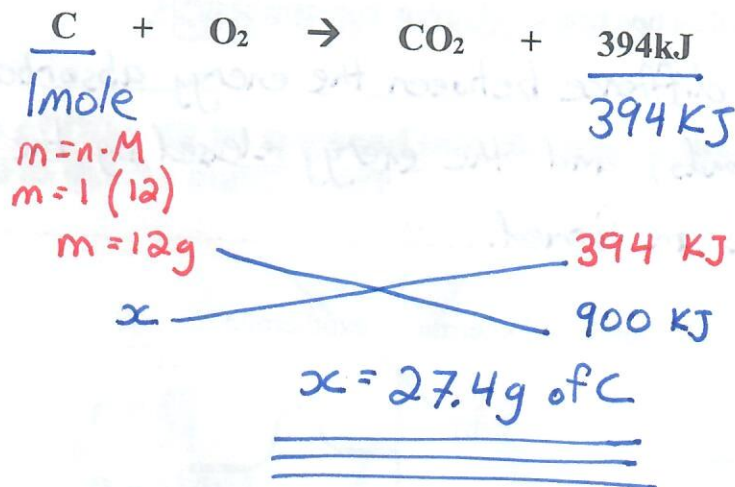
50g

611 kJ

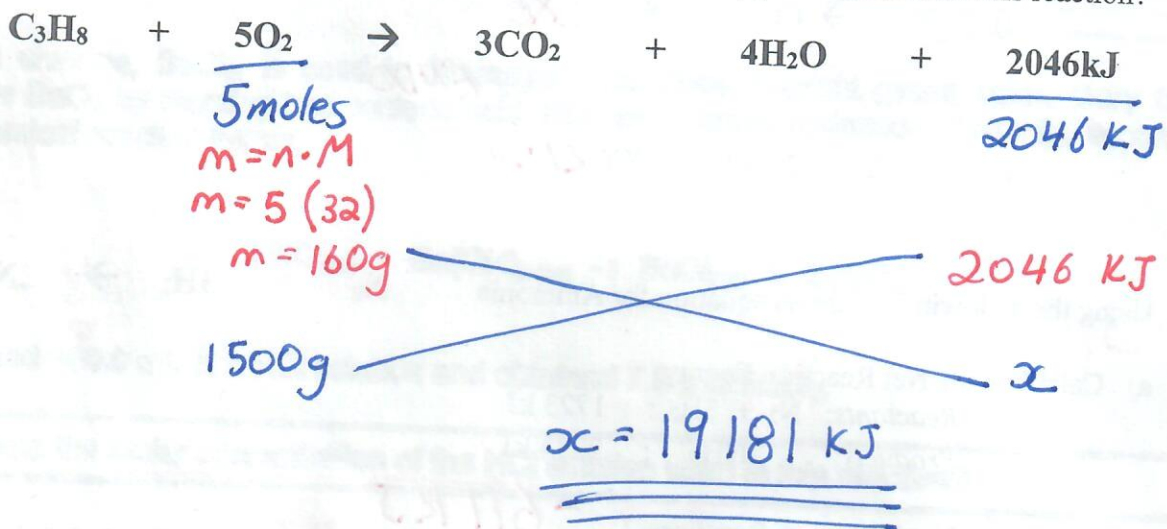
~~x~~

x = 1091 kJ

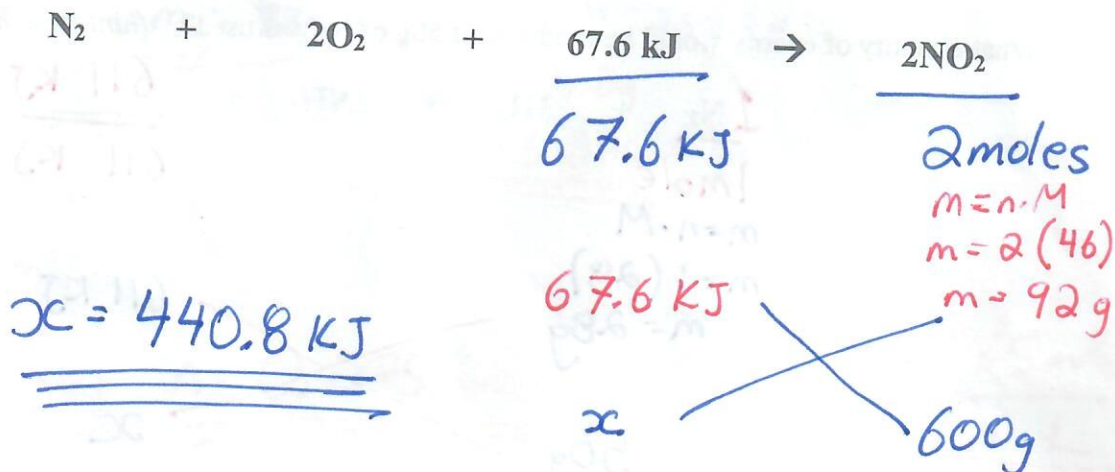
- 4) The complete reaction of 1 mole of carbon releases 394kJ. If you want to obtain 900kJ of heat, what mass of carbon must be burned?



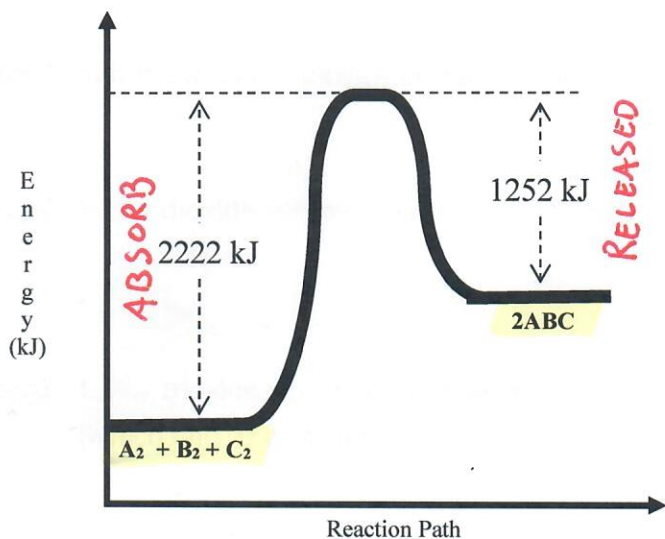
- 5) The combustion of propane (C_3H_8) releases 2046kJ of heat energy as seen in the balanced equation below. What quantity of heat would be released if 1.5kg of oxygen is needed for this reaction?



- 6) What amount of energy would be needed to produce 600g of nitrogen dioxide.



7) Study the following reaction energy diagram.



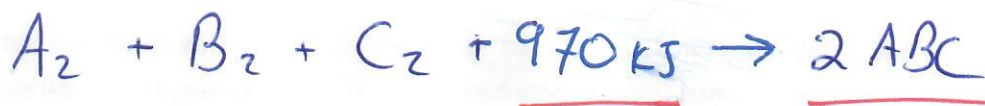
a) Is the reaction Exothermic or Endothermic?

Endothermic

b) What is the value of the net reaction energy for the above reaction?

$$2222 - 1252 = \underline{970 \text{ kJ}}$$

c) How much energy is required for the production of 12.5 moles of ABC?



$$970 \text{ kJ} \quad \begin{matrix} \diagup & \text{2 moles} \\ \diagdown & \text{12.5 moles} \end{matrix}$$

$$\boxed{x = 6062.5 \text{ kJ}}$$