Energy Changes
Multiple Choice Questions
Set 2

Tick **one** box.

1. A student is carrying out an investigation into the exothermic reaction between magnesium metal and hydrochloric acid. What will happen to the temperature of the mixture during the reaction?

   A. it is not possible to predict what will happen to the temperature ☐
   B. the temperature will decrease ☐
   C. the temperature will increase ☐
   D. the temperature will stay the same ☐

2. Which of the following is an example of an endothermic reaction?

   A. combustion ☐
   B. neutralisation ☐
   C. respiration ☐
   D. thermal decomposition ☐

3. Which of the following is a possible source of error when investigating temperature changes during chemical reactions?

   A. human error due to incorrectly reading the thermometer ☐
   B. systematic error due to the transfer of energy from the reaction container to the surrounding air ☐
   C. zero error due to the balance not being set to zero before measuring the mass of a reactant ☐
   D. all of the above ☐

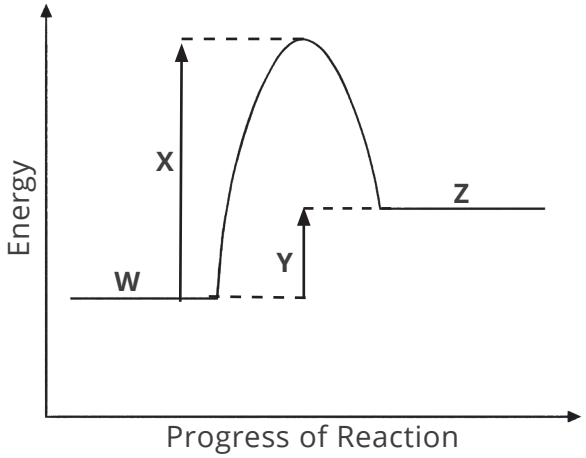
4. A student is investigating how the temperature change of a displacement reaction is affected by the type of metal used. The student adds four different powdered metals to test tubes containing copper sulfate solution and records the temperature change of each reaction.

   Which piece of equipment is **not** necessary for the student's investigation?

   A. measuring cylinder ☐
   B. thermometer ☐
   C. timer ☐
   D. top-pan balance ☐

5. **Figure 1** shows a reaction profile for a chemical reaction.

Figure 1



What does label **X** represent?

A. activation energy ☐
B. overall energy change ☐
C. products ☐
D. reactants ☐

6. Which of the following statements is correct? (**HT only**)

A. a chemical reaction is endothermic if more energy is released when bonds are broken than is taken in when new bonds are formed ☐
B. a chemical reaction is endothermic if more energy is released when new bonds are formed than is taken in when bonds are broken ☐
C. a chemical reaction is exothermic if more energy is released when new bonds are formed than is taken in when bonds are broken ☐
D. a chemical reaction is exothermic if more energy is taken in when bonds are broken than is released when new bonds are formed ☐

Methane reacts with oxygen in a combustion reaction as shown below.

methane + oxygen → carbon dioxide + water

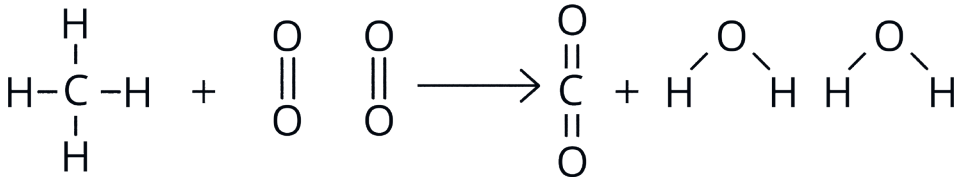


Table 1 shows some bond energy data.

Table 1

Bond	C-H	O=O	C=O	O-H
Bond Energy (kJ/mol)	413	498	805	464

7.How much energy is transferred to break bonds during the combustion of methane? (**HT only**)

A. 911kJ/mol ☐
B. 1409kJ/mol ☐
C. 2648kJ/mol ☐
D. 3536kJ/mol ☐

8. How much energy is transferred when new bonds are formed during the combustion of methane? (**HT only**)

A. 1269kJ/mol ☐
B. 1733kJ/mol ☐
C. 2598kJ/mol ☐
D. 3466kJ/mol ☐

9.What is the overall energy change for the combustion of methane? (**HT only**)

A. –818kJ/mol ☐
B. –324kJ /mol ☐
C. 938kJ/mol ☐
D. 818kJ/mol ☐

10. What does a negative value for the overall energy change of a reaction indicate? (**HT only**)

A. the reaction is endothermic ☐

B. the reaction is exothermic ☐

C. the reaction is not possible ☐

D. the reaction is very slow ☐