

Brett Robbins Academic Consulting

Chemistry 30 Practice Test

Unit A: Thermochemistry

10 Questions

Original practice questions written to the Alberta curriculum, in the style of past diploma examinations. Work through each question, then check your answers with the key at the end.

This practice test was made by AI and there may be mistakes. If a question or answer looks wrong, contact Brett for clarification.

Question 1

Which of the following statements correctly compares photosynthesis and cellular respiration?

- A) Photosynthesis is exothermic, and cellular respiration is endothermic.
- B) Photosynthesis is endothermic, and cellular respiration is exothermic.
- C) Both photosynthesis and cellular respiration are endothermic.
- D) Both photosynthesis and cellular respiration are exothermic.

Question 2

The reaction of nitrogen gas with oxygen gas to form nitrogen monoxide gas is represented by the following equation.



Which of the following statements about this reaction is correct?

- A) The reaction is exothermic, and energy is released to the surroundings.
- B) The reaction is endothermic, and the products have less potential energy than the reactants.
- C) The reaction is endothermic, and energy would be written as a reactant in the equation.
- D) The reaction is endothermic, and the value of ΔH is -180.6 kJ .

Question 3

A chemical reaction occurring in a calorimeter releases energy that is absorbed by 250.0 g of water, raising the temperature of the water by 8.0°C .

The energy transferred to the water, in kJ, is ____.

Question 4

On a potential energy diagram for a chemical reaction, the reactants are at 80 kJ, the activated complex is at 130 kJ, and the products are at 30 kJ.

The activation energy and the enthalpy change for this reaction are shown in row

A) Activation energy : 50 kJ

Enthalpy change : - 50 kJ

B) Activation energy : 130 kJ

Enthalpy change : - 50 kJ

C) Activation energy : 50 kJ

Enthalpy change : + 50 kJ

D) Activation energy : 100 kJ

Enthalpy change : - 110 kJ

Question 5

A catalyst increases the rate of a chemical reaction by

A) increasing the potential energy of the products

B) decreasing the enthalpy change of the reaction

C) increasing the activation energy of the reaction

D) providing an alternative pathway with a lower activation energy

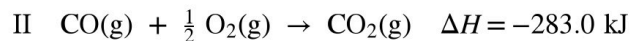
Question 6

Methanol, $\text{CH}_3\text{OH}(\text{l})$, burns completely in oxygen. The molar enthalpy of combustion of methanol is - 726 kJ/mol, and its molar mass is 32.05 g/mol.

The energy released when 64.1 g of methanol is burned completely, in kJ, is ____.

Question 7

Use the following equations to answer this question.



The enthalpy change for the reaction $\text{C(s)} + \frac{1}{2} \text{O}_2\text{(g)} \rightarrow \text{CO(g)}$ is

A) -676.5 kJ

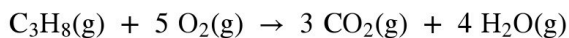
B) $+110.5 \text{ kJ}$

C) -55.3 kJ

D) -110.5 kJ

Question 8

The complete combustion of propane gas is represented by the following equation.



The molar enthalpies of formation are $\text{C}_3\text{H}_8\text{(g)} - 103.8$, $\text{CO}_2\text{(g)} - 393.5$,

and $\text{H}_2\text{O(g)} - 241.8 \text{ kJ/mol}$. The enthalpy change for the reaction is

A) -2043.9 kJ

B) -2219.9 kJ

C) -2147.7 kJ

D) $+2043.9 \text{ kJ}$

Question 9

A student burns 0.500 g of ethanol, $\text{C}_2\text{H}_5\text{OH(l)}$, (molar mass 46.08 g/mol)

in a calorimeter containing 100.0 g of water. The temperature of the water

increases by 12.4°C . The energy released per mole of ethanol burned, in kJ/mol , is ____.

Question 10

On a potential energy diagram, the reactants are at 20 kJ and the products are at 95 kJ. A catalyst lowers the activated complex from 145 kJ to 100 kJ.

For the catalyzed reaction, the activation energy and the enthalpy change are shown in row

A) Activation energy : 80 kJ

Enthalpy change : + 75 kJ

B) Activation energy : 80 kJ

Enthalpy change : - 75 kJ

C) Activation energy : 45 kJ

Enthalpy change : + 75 kJ

D) Activation energy : 125 kJ

Enthalpy change : + 75 kJ

Answer Key

- | | | |
|---------|---------|--------|
| 1. B | 5. D | 9. 478 |
| 2. C | 6. 1452 | 10. A |
| 3. 8.37 | 7. D | |
| 4. A | 8. A | |

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