



Energy Changes Multiple Choice Questions

Answer Sheet

Set 1
1 - D
2 - A
3 - A
4 - D
5 - B
6 - B
7 - D
8 - B
9 - A
10 - C

Set 2
1 - C
2 - D
3 - D
4 - C
5 - A
6 - C
7 - C
8 - D
9 - A
10 - B

Set 3
1 - C
2 - B
3 - A
4 - D
5 - D
6 - C
7 - D
8 - C
9 - C
10 - D

Set 4
1 - B
2 - B
3 - A
4 - D
5 - B
6 - C
7 - C
8 - A
9 - C
10 - B

Workings for Calculations

Set 2

7. bonds being broken: $(4 \times \text{C-H}) + (2 \times \text{O=O})$
 $= (4 \times 413) + (2 \times 498) = 2648\text{kJ/mol}$
8. bonds being formed: $(2 \times \text{C=O}) + (4 \times \text{O-H})$
 $= (2 \times 805) + (4 \times 464) = 3466\text{kJ/mol}$
9. overall energy change = energy for breaking bonds – energy released when forming bonds
 $= 2648 - 3644 = -818\text{kJ/mol}$

Set 3

7. bonds being broken: $\text{C-C} + (5 \times \text{C-H}) + \text{C-O} + \text{O-H}$
 $= 348 + (5 \times 413) + 360 + 464 = 3237\text{kJ/mol}$
8. bonds being formed: $\text{C=C} + (4 \times \text{C-H}) + (2 \times \text{O-H})$
 $= 612 + (4 \times 413) + (2 \times 464) = 3192\text{kJ/mol}$
9. overall energy change = energy for breaking bonds – energy released when forming bonds
 $= 3237 - 3192 = 45\text{kJ/mol}$
10. bonds being broken: $\text{H-H} + \text{Cl-Cl}$
bonds being formed: $2 \times \text{H-Cl}$
overall energy change = energy for breaking bonds – energy released when forming bonds
 $(\text{H-H} + 242) - (2 \times 431) = -184\text{kJ/mol}$
 $(\text{H-H} + 242) = -184 + (2 \times 431) = 678$
 $\text{H-H} = 678 - 242 = 436\text{kJ/mol}$