

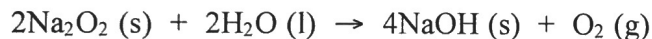
C5Practice

Multiple Choice

Identify the choice that best completes the statement or answers the question.

- _____ 1. The kinetic energy of a 7.3 kg steel ball traveling at 18.0 m/s is _____ J.
- 1.2×10^3
 - 66
 - 2.4×10^3
 - 1.3×10^2
 - 7.3
- _____ 2. Calculate the value of ΔE in joules for a system that loses 50 J of heat and has 150 J of work performed on it by the surroundings.
- 50
 - 100
 - 100
 - 200
 - +200

- _____ 3. The value of ΔH° for the reaction below is -126 kJ. The amount of heat that is released by the reaction of 25.0 g of Na_2O_2 with water is _____ kJ.



- 20.2
- 40.4
- 67.5
- 80.8
- 126

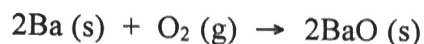
- _____ 4. The value of ΔH° for the reaction below is +128.1 kJ:



How many kJ of heat are consumed when 15.5 g of $\text{CH}_3\text{OH} (\text{l})$ decomposes as shown in the equation?

- 0.48
- 62.0
- 1.3×10^2
- 32
- 8.3

_____ 5. The value of ΔH° for the reaction below is -1107 kJ:



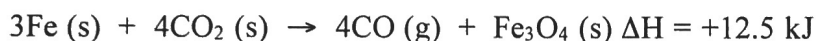
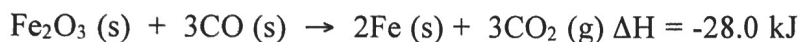
How many kJ of heat are released when 5.75 g of BaO (s) is produced?

- a. 56.9
- b. 23.2
- c. 20.8
- d. 193
- e. 96.3

_____ 6. The specific heat capacity of lead is 0.13 J/g-K. How much heat (in J) is required to raise the temperature of 15 g of lead from 22°C to 37°C?

- a. 2.0
- b. -0.13
- c. 5.8×10^{-4}
- d. 29
- e. 0.13

_____ 7. Given the following reactions



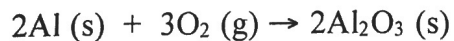
the enthalpy of the reaction of Fe_2O_3 with CO



is _____ kJ.

- a. -59.0
- b. 40.5
- c. -15.5
- d. -109
- e. +109

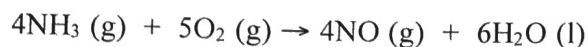
_____ 8. The value of ΔH° for the following reaction is -3351 kJ:



The value of ΔH_f° for $\text{Al}_2\text{O}_3 \text{(s)}$ is _____ kJ.

- a. -3351
- b. -1676
- c. -32.86
- d. -16.43
- e. +3351

9. Given the data in the table below, $\Delta H^{\circ}_{\text{rxn}}$ for the reaction



is _____ kJ.

Substance	ΔH_f° (kJ/mol)
$\text{H}_2\text{O}(\text{l})$	-286
$\text{NO}(\text{g})$	90
$\text{NO}_2(\text{g})$	34
$\text{HNO}_3(\text{aq})$	-207
$\text{NH}_3(\text{g})$	-46

- 1172
- 150
- 1540
- 1892
- The ΔH_f° of $\text{O}_2(\text{g})$ is needed for the calculation.

10. A 25.5-g piece of cheddar cheese contains 37% fat, 28% protein, and 4% carbohydrate. The respective fuel values for protein, fat, and carbohydrate are 17, 38, and 17 kJ/g, respectively. The fuel value for this piece of cheese is _____ kJ.

- 450
- 330
- 790
- 99
- 260

11. The internal energy of a system _____.

- is the sum of the kinetic energy of all of its components
- is the sum of the rotational, vibrational, and translational energies of all of its components
- refers only to the energies of the nuclei of the atoms of the component molecules
- is the sum of the potential and kinetic energies of the components
- none of the above

12. Which one of the following conditions would always result in an increase in the internal energy of a system?

- The system loses heat and does work on the surroundings.
- The system gains heat and does work on the surroundings.
- The system loses heat and has work done on it by the surroundings.
- The system gains heat and has work done on it by the surroundings.
- None of the above is correct.

- _____ 13. When a system _____, ΔE is always negative.
- absorbs heat and does work
 - gives off heat and does work
 - absorbs heat and has work done on it
 - gives off heat and has work done on it
 - none of the above is always negative.
- _____ 14. Which one of the following is an exothermic process?
- ice melting
 - water evaporating
 - boiling soup
 - condensation of water vapor
 - Ammonium thiocyanate and barium hydroxide are mixed at 25°C: the temperature drops.
- _____ 15. ΔH for an endothermic process is _____ while ΔH for an exothermic process is _____.
- zero, positive
 - zero, negative
 - positive, zero
 - negative, positive
 - positive, negative
- _____ 16. For a given process at constant pressure, ΔH is negative. This means that the process is _____.
- endothermic
 - equithermic
 - exothermic
 - a state function
 - energy
- _____ 17. Which one of the following statements is true?
- Enthalpy is an intensive property.
 - The enthalpy change for a reaction is independent of the state of the reactants and products.
 - Enthalpy is a state function.
 - H is the value of q measured under conditions of constant volume.
 - The enthalpy change of a reaction is the reciprocal of the ΔH of the reverse reaction.
- _____ 18. Of the following, ΔH_f° is not zero for _____.
- $O_2(g)$
 - $C(\text{graphite})$
 - $N_2(g)$
 - $F_2(s)$
 - $Cl_2(g)$

- _____ 19. For which one of the following equations is $\Delta H^{\circ}_{\text{rxn}}$ equal to ΔH°_f for the product?
- a. $\text{Xe (g)} + 2\text{F}_2 \text{ (g)} \rightarrow \text{XeF}_4 \text{ (g)}$
 - b. $\text{CH}_4 \text{ (g)} + 2\text{Cl}_2 \text{ (g)} \rightarrow \text{CH}_2\text{Cl}_2 \text{ (l)} + 2\text{HCl (g)}$
 - c. $\text{N}_2 \text{ (g)} + \text{O}_3 \text{ (g)} \rightarrow \text{N}_2\text{O}_3 \text{ (g)}$
 - d. $2\text{CO (g)} + \text{O}_2 \text{ (g)} \rightarrow 2\text{CO}_2 \text{ (g)}$
 - e. $\text{C (diamond)} + \text{O}_2 \text{ (g)} \rightarrow \text{CO}_2 \text{ (g)}$
- _____ 20. With reference to enthalpy changes, the term standard conditions means _____.
- (a) $P = 1 \text{ atm}$
 - (b) some common temperature, usually 298 K
 - (c) $V = 1 \text{ L}$
-
- a. a only
 - b. b only
 - c. c only
 - d. a and c
 - e. a and b

Short Answer

21. You will have two free response type questions. One will involve your understanding of calorimetry, including percent error calculation. The other will involve your determining the standard heat of formation of a substance given thermodynamic data.

C5Practice Answer Section

MULTIPLE CHOICE

1. ANS: A	PTS: 1	DIF: 2	REF: Sec. 5.1
2. ANS: B	PTS: 1	DIF: 2	REF: Sec. 5.2
3. ANS: A	PTS: 1	DIF: 3	REF: Sec. 5.4
4. ANS: B	PTS: 1	DIF: 3	REF: Sec. 5.4
5. ANS: C	PTS: 1	DIF: 3	REF: Sec. 5.4
6. ANS: D	PTS: 1	DIF: 3	REF: Sec. 5.5
7. ANS: A	PTS: 1	DIF: 3	REF: Sec. 5.6
8. ANS: B	PTS: 1	DIF: 2	REF: Sec. 5.7
9. ANS: A	PTS: 1	DIF: 3	REF: Sec. 5.7
10. ANS: A	PTS: 1	DIF: 3	REF: Sec. 5.8
11. ANS: D	PTS: 1	DIF: 3	REF: Sec. 5.2
12. ANS: D	PTS: 1	DIF: 2	REF: Sec. 5.2
13. ANS: B	PTS: 1	DIF: 2	REF: Sec. 5.2
14. ANS: D	PTS: 1	DIF: 2	REF: Sec. 5.2
15. ANS: E	PTS: 1	DIF: 1	REF: Sec. 5.3
16. ANS: C	PTS: 1	DIF: 1	REF: Sec. 5.3
17. ANS: C	PTS: 1	DIF: 3	REF: Sec. 5.4
18. ANS: D	PTS: 1	DIF: 2	REF: Sec. 5.7
19. ANS: A	PTS: 1	DIF: 3	REF: Sec. 5.7
20. ANS: E	PTS: 1	DIF: 1	REF: Sec. 5.7

SHORT ANSWER

21. ANS:
?

PTS: 1