

CHEM 110: Chapter 5 Practice Test Questions

Multiple Choice

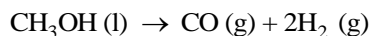
- 1) The kinetic energy of a 7.3 kg steel ball traveling at 18.0 m/s _____ J.
- A) 1.2×10^3
 - B) 66
 - C) 2.4×10^3
 - D) 1.3×10^2
 - E) 7.3
- 2) Calculate the kinetic energy in joules of an 80.0 g bullet traveling at 300.0 m/s.
- A) 3.60×10^6
 - B) 1.20×10^4
 - C) 3.60×10^3
 - D) 12.0
 - E) 80.0
- 3) The ΔE of a system that releases 12.4 J of heat and does 4.2 J of work on the surroundings is _____ J.
- A) 16.6
 - B) 12.4
 - C) 4.2
 - D) -16.6
 - E) -8.2
- 4) The change in the internal energy of a system that absorbs 2,500 J of heat and that does 7,655 J of work on the surroundings is _____ J.
- A) 10,155
 - B) 5,155
 - C) -5,155
 - D) -10,155
 - E) 1.91×10^7
- 5) The value of ΔH° for the reaction below is -72 kJ. _____ kJ of heat are released when 1.0 mol of HBr is formed in this reaction.
- $$\text{H}_2 (\text{g}) + \text{Br}_2 (\text{g}) \rightarrow 2\text{HBr} (\text{g})$$
- A) 144
 - B) 72
 - C) 0.44
 - D) -36
 - E) -72

6) The value of ΔH° for the reaction below is -790 kJ. The enthalpy change accompanying the reaction of 0.95 g of S is _____ kJ.



- A) 23
- B) -23
- C) -12
- D) 12
- E) -790

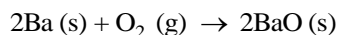
7) The value of ΔH° for the reaction below is +128.1 kJ:



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

- A) 0.48
- B) 62.0
- C) 1.3×10^2
- D) 32
- E) 8.3

8) The value of ΔH° for the reaction below is -1107 kJ:



How many kJ of heat are released when 15.75 g of Ba (s) reacts completely with oxygen to form BaO (s)?

- A) 20.8
- B) -63.5
- C) 114
- D) 70.3
- E) -35.1

9) A sample of aluminum metal absorbs 9.86 J of heat, upon which the temperature of the sample increases from 23.2°C to 30.5°C. Since the specific heat capacity of aluminum is 0.90 J/g-K, the mass of the sample is _____ g.

- A) 72
- B) 1.5
- C) 65
- D) 8.1
- E) 6.6

10) The temperature of a 15-g sample of lead metal increases from 22°C to 37°C upon the addition of 29.0 J of heat. The specific heat capacity of the lead is _____ J/g-K.

- A) 7.8
- B) 1.9
- C) 29
- D) 0.13
- E) -29

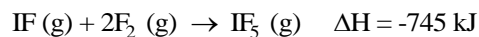
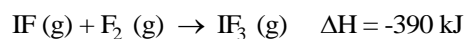
11) The specific heat of liquid bromine is 0.226 J/g-K. How much heat (J) is required to raise the temperature of 10.0 mL of bromine from 25.00°C to 27.30°C? The density of liquid bromine: 3.12 g/mL.

- A) 5.20
- B) 16.2
- C) 300
- D) 32.4
- E) 10.4

12) ΔH for the reaction

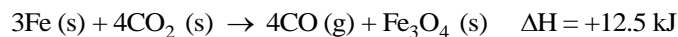
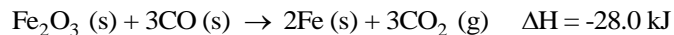


is _____ kJ, given the data below.

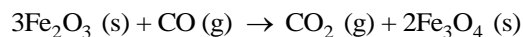


- A) +355
- B) -1135
- C) +1135
- D) +35
- E) -35

13) Given the following reactions



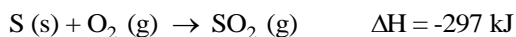
the enthalpy of the reaction of Fe_2O_3 with CO



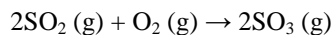
is _____ kJ.

- A) -59.0
- B) 40.5
- C) -15.5
- D) -109
- E) +109

14) Calculate ΔH° (in kJ) for reaction 3.



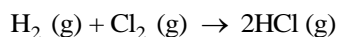
the enthalpy of the reaction in which sulfur dioxide is oxidized to sulfur trioxide



is _____ kJ.

- A) 196
- B) -196
- C) 1087
- D) -1384
- E) -543

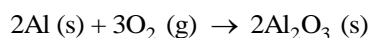
15) The value of ΔH° for the reaction below is -186 kJ.



The value of ΔH_f° for HCl (g) is _____ kJ/mol.

- A) -3.72×10^2
- B) -1.27×10^2
- C) -93.0
- D) -186
- E) +186

16) The value of ΔH° for the following reaction is -3351 kJ:



The value of ΔH_f° for Al_2O_3 (s) is _____ kJ.

- A) -3351
- B) -1676
- C) -32.86
- D) -16.43
- E) +3351

17) The internal energy of a system is always increased by _____.

- A) adding heat to the system
- B) having the system do work on the surroundings
- C) withdrawing heat from the system
- D) adding heat to the system and having the system do work on the surroundings
- E) a volume compression

18) Which one of the following is an exothermic process?

- A) ice melting
- B) water evaporating
- C) boiling soup
- D) condensation of water vapor
- E) Ammonium thiocyanate and barium hydroxide are mixed at 25°C: the temperature drops.

19) Which of the following is a statement of the first law of thermodynamics?

- A) $E_k = \frac{1}{2}mv^2$
- B) A negative ΔH corresponds to an exothermic process.
- C) $\Delta E = E_{\text{final}} - E_{\text{initial}}$
- D) Energy lost by the system must be gained by the surroundings.
- E) 1 cal = 4.184 J (exactly)

20) For a given process at constant pressure, ΔH is negative. This means that the process is _____.

- A) endothermic
- B) equithermic
- C) exothermic
- D) a state function
- E) energy

21) The units of of specific heat are _____.

- A) K/J or °C/J
- B) J/K or J/°C
- C) J/g-K or J/g-°C
- D) J/mol
- E) g-K/J or g-°C/J