

Chapter 5 review questions.

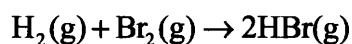
10) The ΔE of a system that releases 12.4 J of heat and does 4.2 J of work on the surroundings is _____ J.

A) 16.6 B) 12.4 C) 4.2 D) -16.6 E) -8.2

12) 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.

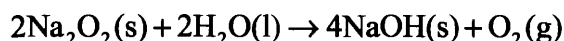
A) 50 B) 100 C) -100 D) -200 E) +200

15) 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.



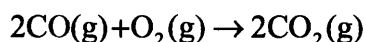
A) 144 B) 72 C) 0.44 D) 36 E) -72

17) 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.



A) 20.2 B) 40.4 C) 67.5 D) 80.8 E) -126

20) The value of ΔH° for the reaction below is -482 kJ. Calculate the heat (kJ) released to the surroundings when 12.0 g of CO (g) reacts completely.



A) 2.89×10^3 B) 207 C) 103 D) 65.7 E) -482

Answer: D Answer: B Answer: D Answer: C

31) The molar heat capacity of a compound with the formula $\text{C}_2\text{H}_6\text{SO}$ is 88.0 J/mol-K. The specific heat of this substance is _____ J/g-K.

A) 88.0 B) 1.13 C) 4.89 D) 6.88×10^3 E) -88.0

32) 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

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

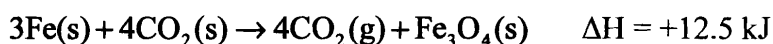
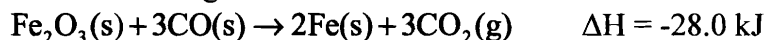
- A) 2.0 B) -0.13 C) 5.8×10^{-4} D) 29 E) 0.13

36) 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.

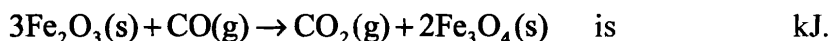
- A) 5.20 B) 16.2 C) 300 D) 32.4 E) 10.4

Answers: 31 B 32 B 33 D 36 B

39) Given the following reactions

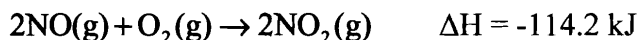
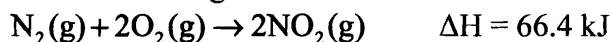


the enthalpy of the reaction of Fe_2O_3 with CO

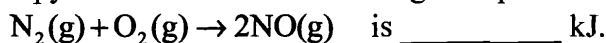


- A) -59.0 B) 40.5 C) -15.5 D) -109 E) +109

40) Given the following reactions

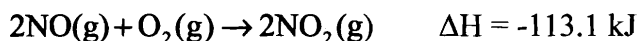
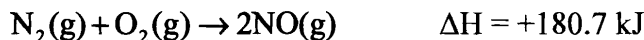


the enthalpy of the reaction of the nitrogen to produce nitric oxide



- A) 180.6 B) -47.8 C) 47.8 D) 90.3 E) -180.6

46) Given the following reactions

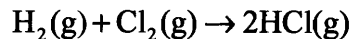


the enthalpy of reaction for $4\text{NO}(\text{g}) \rightarrow 2\text{NO}_2(\text{g}) + \text{N}_2(\text{g})$ is $\underline{\hspace{2cm}}$ kJ.

- A) 67.6 B) 45.5 C) -293.8 D) -45.5 E) 293.8

Answer: 39 A 40 A 46 C

48) 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

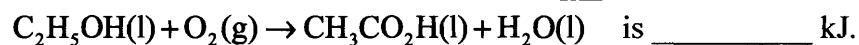
50) Given the data in the table below, $\Delta H^\circ_{\text{rxn}}$ for the reaction



Substance	ΔH_f° (kJ/mol)
Ca(OH) ₂	-986.6
H ₃ AsO ₄	-900.4
Ca(H ₂ AsO ₄) ₂	-2346.0
H ₂ O	-285.9

A) -744.9 B) -4519 C) -4219 D) -130.4 E) -76.4

52) Given the data in the table below, $\Delta H^\circ_{\text{rxn}}$ for the reaction

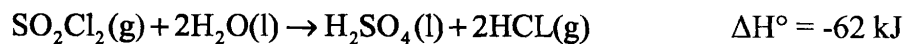


Substance	ΔH_f° (kJ/mol)
C ₂ H ₄ (g)	52.3
C ₂ H ₅ OH (l)	-277.7
CH ₃ CO ₂ H (l)	-484.5
H ₂ O (l)	-285.8

A) -79.0 B) -1048.0 C) -476.4 D) -492.6

E) The value of ΔH_f° of O₂(g) is required for the calculation.

63) Given the data in the table below and $\Delta H_{\text{rxn}}^{\circ}$ for the reaction



ΔH_f° of $\text{HCl}(\text{g})$ is _____ kJ/mol.

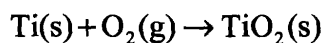
Substance	ΔH_f° (kJ/mol)
$\text{SO}_2(\text{g})$	-297
$\text{SO}_3(\text{g})$	-396
$\text{SO}_2\text{Cl}_2(\text{g})$	-364
$\text{H}_2\text{SO}_4(\text{l})$	-814
$\text{H}_2\text{O}(\text{l})$	-286

A) -184 B) 60 C) -92 D) 30 E) Insufficient data are given.

32) Of the following, ΔH_f° is not zero for _____.

A) $\text{O}_2(\text{g})$ B) C (graphite) C) $\text{N}_2(\text{g})$ D) $\text{F}_2(\text{s})$ E) $\text{Cl}_2(\text{g})$

3) The combustion of titanium with oxygen produces titanium dioxide:



When 2.060 g of titanium is combusted in a bomb calorimeter, the temperature of the calorimeter increases from 25.00 °C to 91.60 °C. In a separate experiment, the heat capacity of the calorimeter is measured to be 9.84 kJ/K. The heat of reaction for the combustion of a mole of Ti in this calorimeter is _____ kJ/mol.

A) 14.3 B) 19.6 C) -311 D) -0.154 E) -1.52×10^4

9) A 50.0-g sample of liquid water at 25.0 °C is mixed with 29.0 g of water at 45.0 °C. The final temperature of the water is _____.

A) 102
B) 27.6
C) 35.0
D) 142
E) 32.3

Answer: 48 C 50 D 52 D 63 C 32 D 3 E 9 E