QUIZ Prep Calorimetry, 6, & 7 a.k.a. Why Does Mr.C Do This to Us?

1) Calculate the kinetic energy in joules of an automobile weighing 2135 lb and traveling at 55 mph. (1 mile = 1.6093 km, 1lb = 453.59 g).

A) 1.2×10^{4}
B) 2.9×10^{5}
C) 5.9×10^{5}
D) 3.2×10^{6}
E) 3.2×10^{-6}

2) Calculate the kinetic energy in joules of a 150 lb jogger (68.1 kg) traveling at 12.0 mile/hr (5.36 m/s).

A) 1.96×10^{3}
B) 365
C) 978
D) 183
E) 68.1

3) 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

4) Given the following reactions

$H_2O(l) \rightarrow H_2O(g)$ ΔH = 44.01 kJ
$2H_2(g)+O_2(g) \rightarrow 2H_2O(g)$ ΔH = -483.64 kJ

the enthalpy for the decomposition of liquid water into gaseous hydrogen and oxygen

$2H_2O(l) \rightarrow 2H_2(g)+O_2(g)$

is _____ kJ.

A) -395.62
B) -527.65
C) 439.63
D) 571.66
E) 527.65

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5) The value of $\Delta H°$ for the following reaction is -3351 kJ:

$$2Al(s) + 3O_2(g) \rightarrow 2Al_2O_3(s)$$

The value of $\Delta H_f°$ for $Al_2O_3(s)$ is _____ kJ.

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

6) Given the data in the table below, $\Delta H°_{rxn}$ for the reaction

$$C_2H_5OH(l) + O_2(g) \rightarrow CH_3CO_2H(l) + H_2O(l)$$

is _____ kJ.

Substance	$\Delta H_f°$ (kJ/mol)
C_2H_4 (g)	52.3
C_2H_5OH (l)	-277.7
CH_3CO_2H (l)	-484.5
H_2O (l)	-285.8

A) -79.0
B) -1048.0
C) -476.4
D) -492.6
E) The value of $\Delta H_f°$ of $O_2(g)$ is required for the calculation.

7) 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

8) Which one of the following statements is true?

A) Enthalpy is an intensive property.
B) The enthalpy change for a reaction is independent of the state of the reactants and products.
C) Enthalpy is a state function.
D) H is the value of q measured under conditions of constant volume.
E) The enthalpy change of a reaction is the reciprocal of the ΔH of the reverse reaction.

9) Which of the following statements is false?

A) Internal energy is a state function.
B) Enthalpy is an intensive property.
C) The enthalpy change for a reaction is equal in magnitude, but opposite in sign, to the enthalpy change for the reverse reaction.
D) The enthalpy change for a reaction depends on the state of the reactants and products.
E) The enthalpy of a reaction is equal to the heat of the reaction.

10) A chemical reaction that absorbs heat from the surroundings is said to be _____ and has a _____ ΔH at constant pressure.

A) endothermic, positive
B) endothermic, negative
C) exothermic, negative
D) exothermic, positive
E) exothermic, neutral

11) Under what condition(s) is the enthalpy change of a process equal to the amount of heat transferred into or out of the system?

(a) temperature is constant
(b) pressure is constant
(c) volume is constant

A) a only
B) b only
C) c only
D) a and b
E) b and c

12) What color of visible light has the highest energy?

A) violet
B) blue
C) red
D) green
E) yellow

13) Which one of the following is considered to be ionizing radiation?

A) visible light
B) radio waves
C) X-rays
D) microwaves
E) infrared radiation

14) A spectrum containing only specific wavelengths is called a _____ spectrum.

A) line
B) continuous
C) visible
D) Rydberg
E) invariant

15) When the electron in a hydrogen atom moves from n = 6 to n = 2, light with a wavelength of _____ nm is emitted.

A) 93.8
B) 434
C) 487
D) 657
E) 410

16) At what speed (m/s) must a 10.0 mg object be moving to have a de Broglie wavelength of 3.3×10^{-41} m ?

A) 4.1
B) 1.9×10^{-11}
C) 2.0×10^{12}
D) 3.3×10^{-42}
E) 9.1×10^{31}

17) The n = 1 shell contains _____ p orbitals. All the other shells contain _____ p orbitals.

A) 3, 6
B) 0, 3
C) 6, 2
D) 3, 3
E) 0, 6

18) The photoelectric effect is _____.

A) the total reflection of light by metals giving them their typical luster
B) the production of current by silicon solar cells when exposed to sunlight
C) the ejection of electrons by a metal when struck with light of sufficient energy
D) the darkening of photographic film when exposed to an electric field
E) a relativistic effect

19) The uncertainty principle states that _____.

A) matter and energy are really the same thing
B) it is impossible to know anything with certainty
C) it is impossible to know the exact position and momentum of an electron
D) there can only be one uncertain digit in a reported number
E) it is impossible to know how many electrons there are in an atom

20) Sodium is much more apt to exist as a cation than is chlorine. This is because _____.

A) chlorine is a gas and sodium is a solid
B) chlorine has a greater electron affinity than sodium does
C) chlorine is bigger than sodium
D) chlorine has a greater ionization energy than sodium does
E) chlorine is more metallic than sodium

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1) Answer: B
Diff: 3
Page Ref: Sec. 5.1

2) Answer: C
Diff: 2
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3) Answer: C
Diff: 2
Page Ref: Sec. 5.1

4) Answer: D
Diff: 3
Page Ref: Sec. 5.6

5) Answer: B
Diff: 2
Page Ref: Sec. 5.7

6) Answer: D
Diff: 3
Page Ref: Sec. 5.7

7) Answer: C
Diff: 1
Page Ref: Sec. 5.3

8) Answer: C
Diff: 3
Page Ref: Sec. 5.4

9) Answer: B
Diff: 3
Page Ref: Sec. 5.4

10) Answer: A
Diff: 2
Page Ref: Sec. 5.4

11) Answer: B
Diff: 3
Page Ref: Sec. 5.4

12) Answer: A
Diff: 1
Page Ref: Sec. 6.2

13) Answer: C
Diff: 1
Page Ref: Sec. 6.2

14) Answer: A
Diff: 1
Page Ref: Sec. 6.3

15) Answer: E
Diff: 1
Page Ref: Sec. 6.3

16) Answer: C
Diff: 1
Page Ref: Sec. 6.4

17) Answer: B
Diff: 1
Page Ref: Sec. 6.5

18) Answer: C
Diff: 1
Page Ref: Sec. 6.2

19) Answer: C
Diff: 1
Page Ref: Sec. 6.5

20) Answer: D
Diff: 1
Page Ref: Sec. 7.4