

Name _____

The answers to all multiple choice questions are to be entered onto the Scantron™ answer sheet. **ONLY the Scantron sheet will be graded.**

1(3) Which metal is the most reactive?

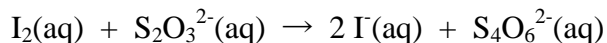
- a) Al b) Ca c) Cu d) Mn e) Zn

2(3) What species is the reducing agent in the reaction below?



- a) Mg b) HNO₃(aq) c) Mg(NO₃)₂(aq) d) NO₂(g) e) H₂O(l)

3(3) Which substance is oxidized in the reaction below?



- a) I₂(aq) b) S₂O₃²⁻(aq) c) I⁻(aq) d) S₄O₆²⁻(aq) e) H₂O(l)

4(3) What is the oxidation number of Cr in Cr₂O₇²⁻

- a) -2 b) -1 c) 0 d) +3 e) +6

5(3) What is the oxidation state of carbon in C₂H₆O?

- a) 0 b) +1 c) -1 d) +2 e) -2

6(3) Which statement is true?

- a) A positive change in enthalpy occurs with exothermic processes.
b) A positive change in enthalpy occurs when heat is released by the system.
c) A negative change in enthalpy occurs when heat is absorbed by the system.
d) A positive change in enthalpy occurs when there is no net heat change for a reaction.
e) A negative change in enthalpy occurs with exothermic processes.

7(3) The heat change for a reaction comes from

- a) the surroundings
b) bonds being broken and bonds being formed
c) the heat content of the reactants
d) the heat content of the products
e) none of the above

8(3) How many orbitals are in the 3p sublevel?

- a) 1 b) 2 c) 3 d) 4 e) 5

- 9(3) How many electrons can be in the 3d sublevel?
 a) 2 b) 4 c) 6 d) 8 e) 10
- 10(3) How many sublevels are in the $n = 3$ major shell?
 a) 0 b) 1 c) 2 d) 3 e) 4
- 11(3) How many electrons can be in the major shell $n = 3$?
 a) 2 b) 6 c) 9 d) 18 e) none of the previous
- 12(3) What is the maximum number of electrons that can be in a 4f orbital?
 a) 1 b) 2 c) 3 d) 4 e) 6
- 13(3) What is the molarity of Na_3PO_4 in a solution that results when 8.20 g of Na_3PO_4 (MM = 163.94) is dissolved in water and diluted to exactly 250.0 mL?
 a) 0.0799 M b) 0.186 M c) 0.200 M d) 20.0 M e) 32.8 M
- 14(3) A 50.0 mL sample of 0.108 M H_2SO_4 is diluted to 250.0 mL. What is its new molarity?
 a) 0.0216 M b) 0.108 M c) 0.184 M d) 0.461 M e) 0.542 M
- 15(24) Write the formulas of the products for each of the following reactions. Use the symbols, s, l, g, or aq after each product as appropriate. Balance the equations. If no reaction occurs, write NR. Do ONLY 8.
- a) $\text{Al (s)} + \text{SnCl}_2\text{(aq)} \rightarrow$
- b) $\text{H}_2\text{(g)} + \text{AgNO}_3\text{(aq)} \rightarrow$
- c) $\text{CaCl}_2\text{(aq)} + \text{K}_3\text{PO}_4\text{(aq)} \rightarrow$
- d) $\text{Zn(s)} + \text{CuSO}_4\text{(aq)} \rightarrow$
- e) $\text{(NH}_4)_2\text{SO}_4\text{(aq)} + \text{NaNO}_3\text{(aq)} \rightarrow$
- f) $\text{Cr (s)} + \text{HCl(aq)} \rightarrow$
- g) $\text{Mg(OH)}_2\text{(aq)} + \text{HClO}_4\text{(aq)} \rightarrow$
- h) $\text{Pb(NO}_3)_2\text{(aq)} + \text{Cu(s)} \rightarrow$
- i) $\text{(NH}_4)_2\text{SO}_4\text{(aq)} + \text{BaCl}_2\text{(aq)} \rightarrow$
- j) $\text{NaHCO}_3\text{(aq)} + \text{HNO}_3\text{(aq)} \rightarrow$

16(3) Write the net ionic equation for the following reaction.

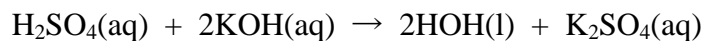


17(3) Write the condensed electron configuration for the ground state of selenium.

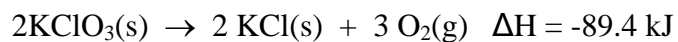
18(3) Write the orbital box diagram for the ground state of Co^{2+} .

19(3) Write the noble gas notation for the ground state of chromium.

20(4) A 35.00 mL sample of H_2SO_4 solution is neutralized completely by exactly 42.63 mL of 0.4153 M KOH. What is the molarity of the H_2SO_4 solution? Show all your work.

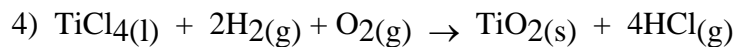


21(6) The decomposition of potassium chlorate is shown by the following equation.

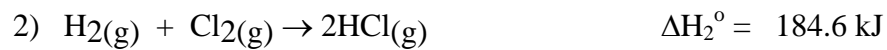


How much heat is released in the decomposition of 38.9 g potassium chlorate?

22(6) Determine the heat of reaction for the process



using the information given below:



23(6) The standard enthalpies of formation for several substances are given below:

$\text{CO}(\text{g})$	-110.5 kJ/mol	$\text{CO}_2(\text{g})$	-393.5 kJ/mol
$\text{H}_2\text{O}(\text{l})$	-285.8 kJ/mol	$\text{H}_2\text{O}(\text{g})$	-241.8 kJ/mol
$\text{H}_2\text{O}_2(\text{l})$	-187.8 kJ/mol	$\text{CH}_3\text{OH}(\text{g})$	-200.7 kJ/mol
$\text{C}_2\text{H}_5\text{OH}(\text{l})$	-277.7 kJ/mol	$\text{C}_2\text{H}_5\text{OH}(\text{g})$	-235.1 kJ/mol

Determine the ΔH° for the reaction below.

