Exam II Physical Science (PSC 102) Form A 10/3/18W 9 am MWF Dr. Hahn Exam # _____

Name Key (print) Name _____(sign)

Please show work for partial credit on the Long Answers and in some of the Short Answer Questions. Multiple choice questi have no partial credit. Please write anything you want graded legibly. If I cannot read your work, I obviously cannot grade it. (1 pts print AND sign exam)

NA = not attempted BA = bad attempt

Part I MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question. (No Partial Credit for MC) (3 pts per question, 24 pts pts total)

NW = no work

1) The substances that are formed by a chemical reaction are called the 1) A

(A) products. B) chemicals. C) precipitates. D) reactants

2) An acid added to a base will produce a 2) C

A) salt and hydroxide ions. B) stronger acid and base.
(C) salt and water. D) salt and hydrogen ions

3) A balanced chemical equation will have the same _____ on each side. 3) A

(A) number of atoms of each element B) mass of each compound
C) number of moles D) number of molecules

4) .Which type of reaction is $4Al + 3O_2 \rightarrow 2Al_2O_3$? 4) A

(A) Combination B) Decomposition
C) Double-replacement D) Single-replacement

5) What is the preferred name for Mg_3N_2? 5) C

A) Dimagnesium trinitride B) Magnesium trinitride
(C) Magnesium nitride D) Manganese nitrate

6) Which of the following is a strong acid? 6) C

A) acetic acid (H $C_2H_3O_2$, main ingredient of vinegar)
B) carbonic acid (H_2 CO_3 , main ingredient of coca cola)
(C) hydrocholoric acid (H Cl, main ingredient of stomache acid)
D) salicylic acid (main ingredient of aspirin)

7) A solution with a pH of 1 is 7) C

A) strongly basic B) weakly basic (C) strongly acidic D) weakly acidic

8) Which group is the nearest neighbor to the noble gases in the periodic table? 8) D

A) Alkaline earth metals B) Alkali metals
C) Noble gases (D) Halogens

Part II: Short Answers (45 pts) Show work on all questions for **partial and full credit** even on questions which do not specify.

1. Name the following 2 different molecules. Please note the element name given in parenthesis. The two molecules have one common element so only 3 element names are given. (useful information: mono, di, tri, tetra, penta) (12 pts, 3 pts each)

   S O_2 (sulfur oxygen sodium) compound is [(ionic) or (covalent)] (circle one)

   name of compound Sulfur dioxide

   Na_2 O compound is [(ionic) or (covalent)] (circle one)

   name of compound Sodium Oxide

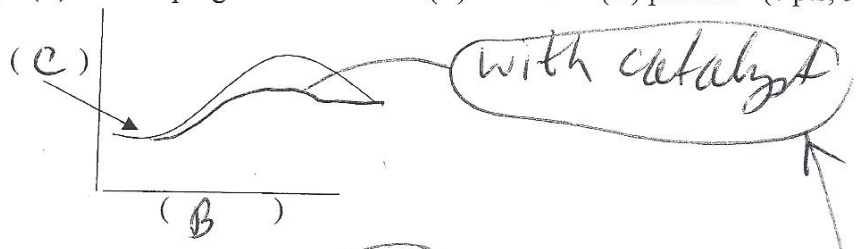
2. Show the element symbol for any one **halogen** F (6 pts)

3 a. Match the following by filling in the blank with one of the following words. **Gas, Liquid, Aqueous** (12 pts, 3 pts each)

(aq) Aqueous (l) liquid (g) gas

b. Draw the reaction arrow for a **dynamic equilibrium** in the space below. (3 pts)

4. a. For the following energy diagram, label by matching the letter to the provided parenthesis. (A) Energy (B) time or progress of reaction (C) reactant (D) product (6 pts, 3 pts each)



b. Is the reaction [(exothermic) or (endothermic)] (circle one) Explain how you know. (3 pts)

reactant to product is uphill - need to absorb energy

c. Would the reaction whose energy diagram is shown feel [(hot) or (cold)] (circle one) if you could hold the reaction in your hand ? (3 pts)

d. **In the energy diagram above**, draw your own energy diagram (hill) for the same reaction with a catalyst. (5 pts)

Part III: Long Answers (30 pts) Show work on all questions for partial and full credit even on questions which do not specify. Remember "attempt" points.

1. Given the following reactant, write down the expected reaction product. **Reaction does not need to be balanced.** (18 pts, 3 pts each blank)

   a. $C_{10}H_{22}$ + O_2 → CO_2 (g) + H_2O (l)

The reaction that you show is [(acid base reaction) or (combustion reaction)] (circle one)

   b. HF + KOH → KF (aq) + H_2O (l)

The reaction that you show is [(acid base reaction) or (combustion reaction)] (circle one)

1. a. Balance the following reaction by filling in numbers into the blanks. (6 pts, 3 pts each)

2 Mn + 2 O_2 → 2 MnO_2

b. After you balance the reaction show how many of each different element atom is in both the reactant and product side. (6 pts)

reactant

2 Mn, 4 O

product

2 Mn, 2*2 O = 4 O

Exam II Physical Science (PSC 102) Form B 10/3/18W 9 am MWF Dr. Hahn Exam # _____

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Please show work for partial credit on the Long Answers and in some of the Short Answer Questions. Multiple choice questi have no partial credit. Please write anything you want graded legibly. If I cannot read your work, I obviously cannot grade it. (1 pts print AND sign exam)

NA = not attempted BA = bad attempt

Part I MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question. (No Partial Credit for MC) (3 pts per question, 24 pts pts total)

NW = no work

1) What is the preferred name for Mg_3N_2? 1) B

A) Manganese nitrate
(B) Magnesium nitride
C) Dimagnesium trinitride
D) Magnesium trinitride

2) .Which type of reaction is $4Al + 3O_2 \rightarrow 2Al_2O_3$? 2) A

(A) Combination
B) Double-replacement
C) Decomposition
D) Single-replacement

3) An acid added to a base will produce a 3) D

A) salt and hydrogen ions
B) stronger acid and base.
C) salt and hydroxide ions.
(D) salt and water.

4) Which group is the nearest neighbor to the noble gases in the periodic table? 4) D

A) Alkali metals
B) Alkaline earth metals
C) Noble gases
(D) Halogens

5) Which of the following is a strong acid? 5) B

A) carbonic acid (H_2CO_3, main ingredient of coca cola)
(B) hydrocholoric acid (HCl, main ingredient of stomache acid)
C) salicylic acid (main ingredient of aspirin)
D) acetic acid ($HC_2H_3O_2$, main ingredient of vinegar)

6) A balanced chemical equation will have the same _____ on each side. 6) A

(A) number of atoms of each element
B) mass of each compound
C) number of molecules
D) number of moles

7) A solution with a pH of 1 is 7) A

(A) strongly acidic B) weakly basic C) weakly acidic D) strongly basic

8) The substances that are formed by a chemical reaction are called the 8) D

A) chemicals. B) reactants C) precipitates. (D) products.

Part II: Short Answers (45 pts) Show work on all questions for **partial and full credit** even on questions which do not specify.

1. Name the following 2 different molecules. Please note the element name given in parenthesis. The two molecules have one common element so only 3 element names are given. (useful information: mono, di, tri, tetra, penta) (12 pts, 3 pts each)

   NCl_3 (nitrogen, chlorine, calcium) compound is [(ionic) or (covalent)] (circle one)

   Name of compounds nitrogen trichloride -1/2

   $CaCl_2$ -1/2 compound is [(ionic) or (covalent)] (circle one)

   name of compound calcium chloride -1/2 attempt

2. Show the element symbol for any one **alkali metal** Na (6 pts) Li, K, Rb, Cs, Fr

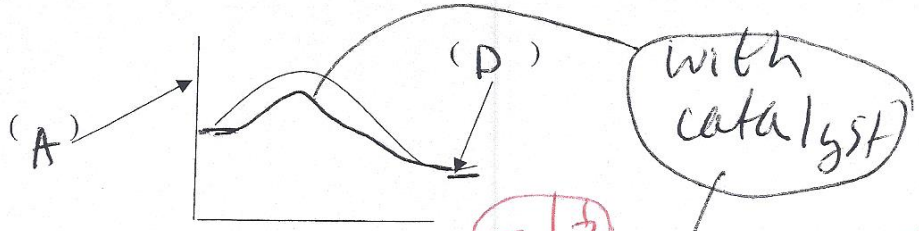
3 a. Match the following by filling in the blank with one of the following words.
Gas, Liquid, Aqueous (12 pts, 3 pts each)

(l) liquid (aq) aqueous (g) gas

b. Draw the reaction arrow for a **dynamic equilibrium** in the space below. (3 pts)

⇌ -1 → -1/2

4. a. For the following energy diagram, label by matching the letter to the provided parenthesis.
(A) Energy (B) time or progress of reaction (C) reactant (D) product (6 pts, 3 pts each)



-1/2 -1 to -1/2

b. Is the reaction [(exothermic) or (endothermic)] (circle one) Explain how you know. (3 pts)

energy from reactant to product is downhill

c. Would the reaction whose energy diagram is shown feel [(hot) or (cold)] (circle one) if you could hold the reaction in your hand ? (3 pts)

d. **In the energy diagram above**, draw your own energy diagram (hill) for the same reaction with a catalyst. (5 pts)

Part III: Long Answers (30 pts) Show work on all questions for partial and full credit even on questions which do not specify. Remember "attempt" points.

reasonable attempt -½

1. Given the following reactant, write down the expected reaction product. **Reaction does not need to be balanced.** (6 pts, 3 pts each blank)

a. H Cl + Na OH → NaCl (aq) + H_2O (l)

-½ -½

The reaction that you show is [(acid base reaction) or (combustion reaction)] (circle one)

b. C_3H_8 + O_2 → CO_2 (g) + H_2O (l)

The reaction that you show is [(acid base reaction) or (combustion reaction)] (circle one)

2 a. Balance the following reaction by filling in numbers into the blanks. (6 pts, 3 pts each)

Ti + 2 Cl_2 → 1 Ti Cl_4

b. After you balance the reaction show how many of each different element atom is in both the reactant and product side. (6 pts)

reactant: 1 Ti, 4 Cl

product: 1 Ti, 4 Cl

attempt -1

BA -3

Exam II Physical Science (PSC 102) Form A 10/3/18W 11 am MWF Dr. Hahn Exam # _____

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NA = not attempted BA = bad attempt

Part I MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question. (No Partial Credit for MC) (3 pts per question, 24 pts pts total)

NW = NO WORK

1) An acid added to a base will produce a 1) C

A) salt and hydrogen ions
B) salt and hydroxide ions.
C) salt and water.
D) stronger acid and base.

2) Which of the following is a strong acid? 2) C

A) salicylic acid (main ingredient of aspirin)
B) acetic acid ($HC_2H_3O_2$, main ingredient of vinegar)
C) hydrocholoric acid (HCl, main ingredient of stomache acid)
D) carbonic acid (H_2CO_3, main ingredient of coca cola)

3) A solution with a pH of 1 is 3) C

A) strongly basic B) weakly acidic C) strongly acidic D) weakly basic

4) A balanced chemical equation will have the same _____ on each side. 4) B

A) mass of each compound
B) number of atoms of each element
C) number of molecules
D) number of moles

5) The substances that are formed by a chemical reaction are called the 5) D

A) chemicals. B) precipitates. C) reactants D) products.

6) .Which type of reaction is $4Al + 3O_2 \rightarrow 2Al_2O_3$? 6) C

A) Single-replacement
B) Decomposition
C) Combination
D) Double-replacement

7) Which group is the nearest neighbor to the noble gases in the periodic table? 7) C

A) Noble gases
B) Alkaline earth metals
C) Halogens
D) Alkali metals

8) What is the preferred name for Mg_3N_2? 8) C

A) Manganese nitrate
B) Dimagnesium trinitride
C) Magnesium nitride
D) Magnesium trinitride

Part II: Short Answers (45 pts) Show work on all questions for **partial and full credit** even on questions which do not specify.

1. Name the following 2 different molecules. Please note the element name given in parenthesis. The two molecules have one common element so only 3 element names are given. (useful information: mono, di, tri, tetra, penta) (12 pts, 3 pts each)

   $Li_3 P$ (lithium, phosphorus, iodine) compound is [(ionic) or (covalent)] (circle one)

   name of compound lithium phosphide

   $P I_3$ compound is [(ionic) or (covalent)] (circle one)

   name of compound phosphorus triodide

2. Show the element symbol for any one **alkaline earth metal** _____ (6 pts)

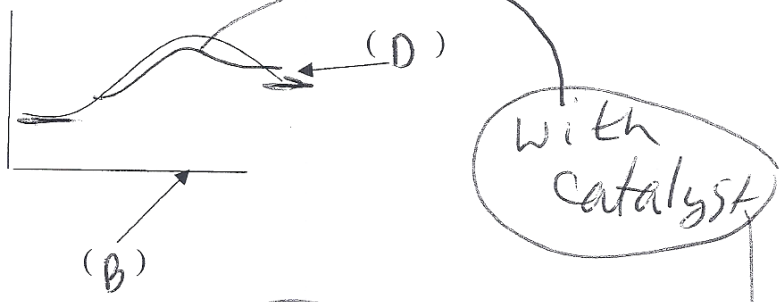
3 a. Match the following by filling in the blank with one of the following words.
Gas, Liquid, Aqueous (12 pts, 3 pts each)

(g) gas (aq) aqueous (l) liquid

b. Draw the reaction arrow for a **dynamic equilibrium** in the space below. (3 pts)

⇌

4. a. For the following energy diagram, label by matching the letter to the provided parenthesis.
(A) Energy (B) time or progress of reaction (C) reactant (D) product (6 pts, 3 pts each)



b. Is the reaction [(exothermic) or (endothermic)] (circle one) Explain how you know. (3 pts)

reactant to product goes uphill

c. Would the reaction whose energy diagram is shown feel [(hot) or (cold)] (circle one) if you could hold the reaction in your hand ? (3 pts)

d. **In the energy diagram above**, draw your own energy diagram (hill) for the same reaction with a catalyst. (5 pts)

Part III: Long Answers (30 pts) Show work on all questions for partial and full credit even on questions which do not specify. Remember "attempt" points.

1. Given the following reactant, write down the expected reaction product. **Reaction does not need to be balanced.** (6 pts, 3 pts each blank)

a. H Br + Li OH → Li Br (aq) + H_2O (l)

The reaction that you show is [(acid base reaction) or (combustion reaction)] (circle one)

b. C_8H_{18} + O_2 → CO_2 (g) + H_2O (l)

The reaction that you show is [(acid base reaction) or (combustion reaction)] (circle one)

1. a. Balance the following reaction by filling in numbers into the blanks. (6 pts, 3 pts each)

2 Al + 3 Cl_2 → 2 $AlCl_3$

b. After you balance the reaction show how many of each different element atom is in both the reactant and product side. (6 pts)

reactant: 2 Al, 6 Cl

product: 2 Al, 6 Cl

Exam II Physical Science (PSC 102) Form B 10/3/18W 11 am MWF Dr. Hahn Exam # 29

Name Key (print) Name _____ (sign)

Please show work for partial credit on the Long Answers and in some of the Short Answer Questions. Multiple choice questi have no partial credit. Please write anything you want graded legibly. If I cannot read your work, I obviously cannot grade it. (1 pts print AND sign exam)

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Part I MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question. (No Partial Credit for MC) (3 pts per question, 24 pts pts total)

NW = no work

1) What is the preferred name for Mg_3N_2? 1) D

A) Dimagnesium trinitride
B) Manganese nitrate
C) Magnesium trinitride
D) Magnesium nitride

2) A balanced chemical equation will have the same _____ on each side. 2) A

A) number of atoms of each element
B) mass of each compound
C) number of molecules
D) number of moles

3) .Which type of reaction is $4Al + 3O_2 \rightarrow 2Al_2O_3$? 3) A

A) Combination
B) Single-replacement
C) Double-replacement
D) Decomposition

4) The substances that are formed by a chemical reaction are called the 4) D

A) precipitates. B) reactants C) chemicals. D) products.

5) Which of the following is a strong acid? 5) A

A) hydrocholoric acid (H Cl, main ingredient of stomache acid)
B) carbonic acid ($H_2 CO_3$, main ingredient of coca cola)
C) acetic acid ($H C_2H_3O_2$, main ingredient of vinegar)
D) salicylic acid (main ingredient of aspirin)

6) A solution with a pH of 1 is 6) B

A) strongly basic B) strongly acidic C) weakly basic D) weakly acidic

7) Which group is the nearest neighbor to the noble gases in the periodic table? 7) C

A) Noble gases
B) Alkaline earth metals
C) Halogens
D) Alkali metals

8) An acid added to a base will produce a 8) A

A) salt and water.
B) salt and hydroxide ions.
C) stronger acid and base.
D) salt and hydrogen ions

Part II: Short Answers (45 pts) Show work on all questions for **partial and full credit** even on questions which do not specify.

1. Name the following 2 different molecules. Please note the element name given in parenthesis. The two molecules have one common element so only 3 element names are given. (useful information: mono, di, tri, tetra, penta) (12 pts, 3 pts each)

   $P_2 O_5$ (phosphorus, oxygen, potassium) compound is [(ionic) or (covalent)] (circle one)

   name of compound diphosphorus pentoxide -½

   $K_3 P$ compound is [(ionic) or (covalent)] (circle one)

   name of compound potassium phosphide

2. Show the element symbol for any one **noble gas** He (6 pts) Ne, Ar, Kr, Xe, Rn

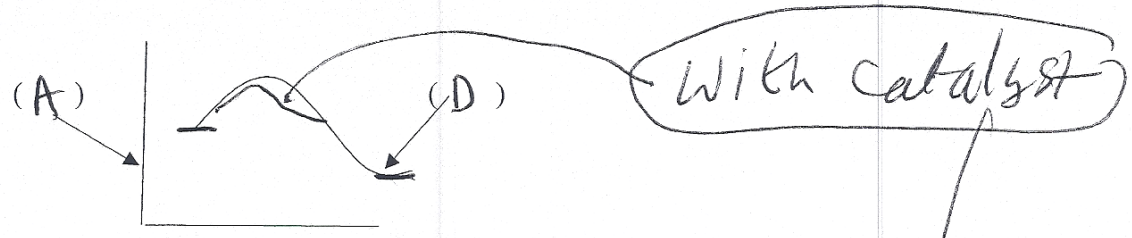
3 a. Match the following by filling in the blank with one of the following words.
Gas, Liquid, Aqueous (12 pts, 3 pts each)

(g) gas (l) liquid (aq) aqueous

b. Draw the reaction arrow for a **dynamic equilibrium** in the space below. (3 pts)

⇌ → -1 ⟷ -½

4. a. For the following energy diagram, label by matching the letter to the provided parenthesis.
(A) Energy (B) time or progress of reaction (C) reactant (D) product (6 pts, 3 pts each)



b. Is the reaction [(exothermic) or (endothermic)] (circle one) Explain how you know. (3 pts)

going downhill in energy from reactant to product

c. Would the reaction whose energy diagram is shown feel [(hot) or (cold)] (circle one) if you could hold the reaction in your hand ? (3 pts)

d. **In the energy diagram above**, draw your own energy diagram (hill) for the same reaction with a catalyst. (5 pts)

Part III: Long Answers (30 pts) Show work on all questions for partial and full credit even on questions which do not specify. Remember "attempt" points.

1. Given the following reactant, write down the expected reaction product. **Reaction does not need to be balanced.** (6 pts, 3 pts each blank)

reasonable attempt -1/2

a. C_4H_{10} + O_2 → CO_2 (g) + H_2O (l)

The reaction that you show is [(acid base reaction) or (combustion reaction)] (circle one)

b. HI + KOH → KI (aq) + H_2O (l)

The reaction that you show is [(acid base reaction) or (combustion reaction)] (circle one)

2. a. Balance the following reaction by filling in numbers into the blanks. (6 pts, 3 pts each)

2 Sr + 1 O_2 → 2 Sr O

b. After you balance the reaction show how many of each different element atom is in both the reactant and product side. (6 pts)

reactant: 2 Sr, 2 O

product: 2 Sr, 2 O

B A -3

attempt -1