Chemistry 116 Name

Martin Larter

Exam1 Fall 2013

Page 1 (20 points)

Page 2 (24 points)

Page 3 (23 points)

Page 4 (21 points)

Page 5 (12 points)

Total (100 points)

Percent (100 %)

Grossmont College

Periodic Table

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| IA |  |  |  |  |  |  |  |  |  |  | |  |  |  |  |  | VIIA | NOBLE GASES |
| 1  **H**  1.008 | IIA |  |  |  |  |  |  |  |  |  | |  | IIIA | IVA | VA | VIA | 1  **H**  1.008 | 2  **He**  4.002 |
| 3  **Li**  6.941 | 4  **Be**  9.012 |  |  |  |  |  |  |  |  |  | |  | 5  **B**  10.81 | 6  **C**  12.01 | 7  **N**  14.01 | 8  **O**  16.00 | 9  **F**  19.00 | 10  **Ne**  20.18 |
| 11  **Na**  23.00 | 12  **Mg**  24.30 | IIIB | IVB | VB | VIB | VIIB | VIII VIII VIII | | | | IB | IIB | 13  **Al**  27.00 | 14  **Si**  28.09 | 15  **P**  30.97 | 16  **S**  32.06 | 17  **Cl**  35.45 | 18  **Ar**  39.95 |
| 19  **K**  39.10 | 20  **Ca**  40.08 | 21  **Sc**  44.96 | 22  **Ti**  47.90 | 23  **V**  50.94 | 24  **Cr**  52.00 | 25  **Mn**  54.94 | 26  **Fe**  55.85 | 27  **Co**  58.93 | 28  **Ni**  58.70 | | 29  **Cu**  63.55 | 30  **Zn**  65.38 | 31  **Ga**  69.72 | 32  **Ge**  72.59 | 33  **As**  74.92 | 34  **Se**  78.96 | 35  **Br**  79.90 | 36  **Kr**  83.80 |
| 37  **Rb**  85.47 | 38  **Sr**  87.62 | 39  **Y**  88.91 | 40  **Zr**  91.22 | 41  **Nb**  92.91 | 42  **Mo**  95.94 | 43  **Tc**  (99) | 44  **Ru**  101.1 | 45  **Rh**  102.9 | 46  **Pd**  106.4 | 47  **Ag**  107.9 | | 48  **Cd**  112.4 | 49  **In**  114.8 | 50  **Sn**  118.7 | 51  **Sb**  121.8 | 52  **Te**  127.6 | 53  **I**  126.9 | 54  **Xe**  131.3 |
| 55  **Cs**  132.9 | 56  **Ba**  137.3 | 57  **La**  138.9 | 72  **Hf**  178.5 | 73  **Ta**  180.9 | 74  **W**  183.9 | 75  **Re**  186.2 | 76  **Os**  190.2 | 77  **Ir**  192.2 | 78  **Pt**  195.1 | 79  **Au**  197.0 | | 80  **Hg**  200.6 | 81  **Tl**  204.4 | 82  **Pb**  207.2 | 83  **Bi**  209.0 | 84  **Po**  (209) | 85  **At**  (210) | 86  **Rn**  (222) |
| 87  **Fr**  (223) | 88  **Ra**  226.0 | 89  **Ac**  227.0 | 104  **Rf**  (261) | 105  **Db**  (262) | 106  **Sg**  (263) | 107  **Bh**  (262) | 108  **Hs**  (265) | 109  **Mt**  (266) | 110  **??**  (269) |  | |  |  |  |  |  |  |  |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 58  **Ce**  140.1 | 59  **Pr**  140.9 | 60  **Nd**  144.2 | 61  **Pm**  (147) | 62  **Sm**  150.4 | 63  **Eu**  152.0 | 64  **Gd**  157.3 | 65  **Tb**  158.9 | 66  **Dy**  162.5 | 67  **Ho**  164.9 | 68  **Er**  167.3 | 69  **Tm**  168.9 | 70  **Yb**  173.0 | 71  **Lu**  175.0 |
| 90  **Th**  232.0 | 91  **Pa**  231.0 | 92  **U**  238.0 | 93  **Np**  (237) | 94  **Pu**  (244) | 95  **Am**  (243) | 96  **Cm**  (247) | 97  **Bk**  (247) | 98  **Cf**  (251) | 99  **Es**  (252) | 100  **Fm**  (257) | 101  **Md**  (258) | 102  **No**  (259) | 103  **Lr**  (260) |

Lanthanide series

Actinide series

1. (4 points) Draw an accurate **Lewis structure** for H2CNOH (condensed formula) below including number of **valence electrons** used. Please use lines to represent bonding electron pairs. Indicate all unshared electrons and make sure this structure has **no** **formal charges**.

Valence electrons\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. (6 points) Draw two other important resonance forms for the following structure. Determine formal charges on original structure and it resonance forms.



1. (10 points) Oxybutynin is used to treat symptoms of overactive bladder, such as frequent or urgent urination, incontinence (urine leakage), and increased night-time urination. The structure of oxybutynin is shown below



Determine the following:

|  |  |  |  |
| --- | --- | --- | --- |
| Central atoms | Molecular Shape | Bond Angles | Hybridization |
| A |  |  |  |
| B |  |  |  |
| C |  |  |  |
| D |  |  |  |
| E |  |  |  |

1. (4 points) Determine how many primary, secondary, tertiary and quaternary carbons are present by writing the correct number next to the designation below.



How many: 1o \_­­\_\_ 2o \_\_\_ 3o \_\_\_ 4o \_\_\_\_

1. (6 points) The structure for nicotine is shown to the right. Determine the correct molecular formula for this molecule.



* 1. Determine the number of sigma and pi bonds in the structure above

Sigma\_\_\_\_\_\_\_\_\_ Pi\_\_\_\_\_\_\_\_\_\_

* 1. molecular formula for this molecule \_\_\_\_\_\_\_\_\_\_\_\_

1. (6 points) Identify the functional group(s) that appear in acebutolol. This compound is in a class of drugs called beta-blockers, which are used to lower blood pressure, lower heart rate, reduce angina (chest pain), and reduce the risk of recurrent heart attacks.



A\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

B\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

C.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. (8 points) Draw structures that correspond with the following names.

trans-1-bromo-3-isopropylcyclopentane cis-6-isopropyl-3-phenyl-4-nonene

1. (8 points) Below each structure, write the name of the following:

 

Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. (10 points) Give the major product(s) for each of the following reactions:



1. (5 points) Draw the missing substituents on the chair structure below so that it represents the same *cis* or *trans* isomer, draw the most stable form, as the structure on the left. *Do not* draw wedged bonds on the chair structure. (methyl is larger than hydroxyl) (4 pts)

 

1. (10 points)Write out the reaction mechanism (curved arrows, intermediates, etc.) for the following reaction.



1. (5 points) Rank the following sets in order from highest (1) to lowest (3) value in boiling point. Explain what is responsible for the ranking.



\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Explain:

1. (6 points) Draw structures for all of the possible products that result from the following reaction.



1. (6 points) Why are alkenes and alkynes more reactive than alkanes? Use drawings to illustrate your answer.
2. (6 points) Indicate whether the compounds in each set are **constitutional isomers,** the **same molecule** or **unrelated**.

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_