Name_____

Instructions

– All Backpacks, Purses, Cell Phones, Textbooks, Notes, etc. should be placed at the front of the classroom.
– Write your name, and bubble in your exam version (A, B, C, etc.) on your scantron!
– Do not write any equations, or work out any problems on your scantron (this may be considered cheating).
– Be careful to check all answers and make sure mistakes on your scantron are properly erased before turning in your exam. (Grade corrections for incorrectly marked scantrons will not be made.)

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

1) Which of the following is the correct ground state electron configuration for a sodium atom? 1) _____

A) $1s^2 2s^2 2p^6 3s^1$
B) $1s^2 2s^2 2p^6 3s^2 3p^1$
C) $1s^2 2s^2 2p^7$
D) $1s^2 2s^2 2p^6 3p^1$
E) $1s^2 2s^2 2p^6$

2) What is the ionic charge for the nickel ion in $NiCO_3$? 2) _____

A) zero
B) 1+
C) 2+
D) 3+
E) none of the above

3) The density of water at 3.98 °C is 1.00 g/mL. What is the density in g/cm^3? 3) _____

A) 1.00 g/cm^3
B) 2.54 g/cm^3
C) 16.4 g/cm^3
D) 62.4 g/cm^3
E) 3.98 g/cm^3

4) Which element has the abbreviated ground-state electron configuration $[Ar]4s^2 3d^5$? 4) _____

A) V B) Fe C) Cr D) Cl E) Mn

5) What is the predicted ionic charge for a Ba ion? 5) _____

A) 1–
B) 1+
C) 2+
D) 2–
E) none of the above

6) The correct multiplier for the prefix milli is: 6) _____

A) 10^{-3} B) 10^{-12} C) 10^{-6} D) 10^{-9}

7) What is the systematic name for $(NH_4)_2CO_3$? 7) _____

A) diammonium hydrogen carbonate
B) ammonium dicarbonate
C) ammonium carbonate
D) diammonium carbonate
E) none of the above

8) The mass of a sample is 0.550grams. Which of the following expresses that mass in kilograms? 8) _____

A) 5.5×10^{-4} kg
B) 5.5×10^{-6} kg
C) 5.5×10^{-1} kg
D) 5.5×10^{8} kg
E) 5.5×10^{5} kg

9) How many significant digits are in the mass measurement 0.050 g? 9) _____

A) 1
B) 2
C) 3
D) 4
E) none of the above

10) Which of the following electron transitions in the hydrogen atom result in *emission* of light? 10) _____

A) $n = 2$ to $n = 3$ B) $n = 3$ to $n = 2$ C) $n = 2$ to $n = 5$ D) $n = 2$ to $n = 6$

11) What is the chemical formula for cobalt(II) bromide? 11) _____

A) Co_2Br_3
B) $CoBr_2$
C) Co_2Br
D) Co_3Br_2
E) none of the above

12) Calculate the following to the correct precision 12) _____

250.0 mL + 5.00 mL =

A) 250 mL B) 256 mL C) 255 mL D) 255.00 mL E) 255.0 mL

13) Osmium is one of the most dense elements (22.5 g/cm^3). What is the mass of 10.0cm^3 of the metal? 13) _____

A) 0.444 g B) 22.5 g C) 225 g D) 2.25 g E) 444 g

14) What is the chemical formula for the manganese(II) ion? 14) _____

A) Mn^{2+}
B) Mn^{3+}
C) Mg^{3+}
D) Mg^{2+}
E) none of the above

15) Express the exponential number 5.15×10^5 as an ordinary number. 15) _____

A) 515,000
B) 0.000 051 5
C) 51,500
D) 0.000 515
E) none of the above

16) Air contains nitrogen, oxygen, argon, and other gases. Which of the following describes air? 16) _____

A) heterogeneous mixture
B) element
C) homogeneous mixture
D) compound
E) none of the above

17) Which of the following elements has the largest atomic radius? 17) _____

A) Na B) Al C) Ca D) Cs E) Fe

18) What is the chemical formula for hydrobromic acid? 18) _____

A) HBrO(*aq*)
B) $HBrO_3$(*aq*)
C) $HBrO_2$(*aq*)
D) HBr(*aq*)
E) none of the above

19) Which of the following subatomic particles is found outside the nucleus? 19) _____

A) neutron
B) electron
C) proton
D) all of the above
E) none of the above

20) What is the chemical formula for the perchlorate ion? 20) _____

A) ClO_2^-
B) ClO_3^-
C) ClO^-
D) ClO_4^-
E) none of the above

21) A hybrid vehicle has a mileage rating of 22 km/L. What is the gas mileage in miles per gallon? 21) _____
(Given: 1 mi = 1.61 km, and 1 gal = 3.78 L)

A) 52 mi/gal B) 9.4 mi/gal C) 130 mi/gal D) 35 mi/gal E) 3.6 mi/gal

22) What is the chemical formula for laughing gas, dinitrogen monooxide? 22) _____

A) N_2O
B) NO
C) NO_2
D) N_2O_2
E) none of the above

23) What is the chemical formula for the ternary compound composed of Zn^{2+} and OH^- ions? 23) _____

A) $ZnOH_2$
B) Zn_2OH
C) ZnOH
D) $Zn(OH)_2$
E) none of the above

24) If a glass marble weighs 3150 mg, what is the mass in centigrams? 24) _____

A) 3.15 cg
B) 31,050 cg
C) 315 cg
D) 31.5 cg
E) none of the above

25) Using atomic notation, indicate the isotope having 30 p^+, 35 n^0, and 30 e^-. 25) _____

A) $^{35}_{30}Br$ B) $^{65}_{30}Zn$ C) $^{65}_{35}Br$ D) $^{65}_{35}Zn$ E) $^{35}_{30}Zn$

Formulas

$d = m / V$

$K = °C + 273.15$

$°F = (9/5)(°C) + 32°$

$q = mc\Delta T$

$\Delta T = T_f - T_i$ or $\Delta T = T_2 - T_1$

Volume of a rectangular prism(bar), $V = l \bullet w \bullet h$

Volume of a cylinder, $V = \pi r^2 h$

Greek Prefixes

1-mono
2-di
3-tri
4-tetra
5-penta
6-hexa
7-hepta
8-octa
9-nona
10-deca

Conversions

1mol = 6.022×10^{23}
1 cm^3 = 1 mL (exactly)
1 m = 39.37 in
1 in = 2.54 cm (exactly)
1mi = 1.609 km
1 gal = 3.785 L
4 qt = 1 gal (exactly)
1 kg = 2.205 lb
1 lb = 453.6 g
1 cal = 4.184 J
1 metric ton = 1000 kg

Densities

Water = 1.0 g/mL
Mercury = 13.5 g/mL

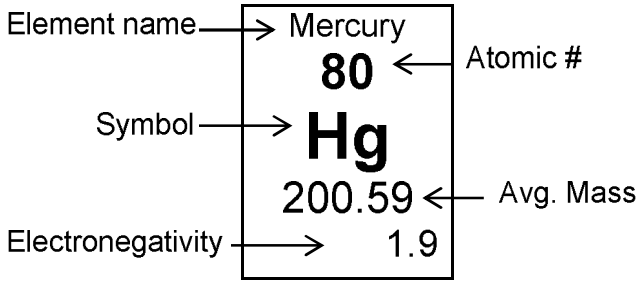
Specific Heat Capacities

Lead = 0.128 J/g·°C
Gold = 0.128 J/g·°C
Ethanol = 2.42 J/g·°C
Copper = 0.385 J/g·°C
Water = 4.18 J/g·°C

Metric

pico = 10^{-12}
mega = 10^6
tera = 10^9

The Periodic Table of the Elements



1																	18
Hydrogen 1 H 1.008 2.1	2											13	14	15	16	17	Helium 2 He 4.003 ---
Lithium 3 Li 6.94 1.0	Beryllium 4 Be 9.01 1.5											Boron 5 B 10.81 2.0	Carbon 6 C 12.011 2.5	Nitrogen 7 N 14.007 3.0	Oxygen 8 O 15.999 3.5	Fluorine 9 F 18.998 4.0	Neon 10 Ne 20.180 ---
Sodium 11 Na 22.99 0.9	Magnesium 12 Mg 24.31 1.2	3	4	5	6	7	8	9	10	11	12	Aluminum 13 Al 26.98 1.5	Silicon 14 Si 28.09 1.8	Phosphorus 15 P 30.97 2.1	Sulfur 16 S 32.07 2.5	Chlorine 17 Cl 35.45 3.0	Argon 18 Ar 39.95 ---
Potassium 19 K 39.10 0.8	Calcium 20 Ca 40.08 1.0	Scandium 21 Sc 44.96 1.3	Titanium 22 Ti 47.88 1.5	Vanadium 23 V 50.94 1.6	Chromium 24 Cr 52.00 1.6	Manganese 25 Mn 54.94 1.5	Iron 26 Fe 55.85 1.8	Cobalt 27 Co 58.93 1.8	Nickel 28 Ni 58.69 1.8	Copper 29 Cu 63.55 1.9	Zinc 30 Zn 65.39 1.6	Gallium 31 Ga 69.72 1.6	Germanium 32 Ge 72.61 1.8	Arsenic 33 As 74.92 2.0	Selenium 34 Se 78.97 2.4	Bromine 35 Br 79.90 2.8	Krypton 36 Kr 83.80 3.0
Rubidium 37 Rb 85.47 0.8	Strontium 38 Sr 87.62 1.0	Yttrium 39 Y 88.91 1.2	Zirconium 40 Zr 91.22 1.4	Niobium 41 Nb 92.91 1.6	Molybdenum 42 Mo 95.94 1.8	Technetium 43 Tc (98) 1.9	Ruthenium 44 Ru 101.07 2.2	Rhodium 45 Rh 102.91 2.2	Palladium 46 Pd 106.42 2.2	Silver 47 Ag 107.87 1.9	Cadmium 48 Cd 112.41 1.7	Indium 49 In 114.82 1.7	Tin 50 Sn 118.71 1.8	Antimony 51 Sb 121.76 1.9	Tellurium 52 Te 127.60 2.1	Iodine 53 I 126.90 2.5	Xenon 54 Xe 131.29 2.6
Cesium 55 Cs 132.91 0.7	Barium 56 Ba 137.33 0.9	Lanthanum 57 La 138.91 1.1 *	Hafnium 72 Hf 178.49 1.3	Tantalum 73 Ta 180.95 1.5	Tungsten 74 W 183.84 1.7	Rhenium 75 Re 186.21 1.9	Osmium 76 Os 190.23 2.2	Iridium 77 Ir 192.22 2.2	Platinum 78 Pt 195.08 2.2	Gold 79 Au 196.97 2.4	Mercury 80 Hg 200.59 1.9	Thallium 81 Tl 204.38 1.8	Lead 82 Pb 207.20 1.8	Bismuth 83 Bi 208.98 1.9	Polonium 84 Po (209) 2.0	Astatine 85 At (210) 2.2	Radon 86 Rn (222) 2.4
Francium 87 Fr (223) 0.7	Radium 88 Ra (226) 0.9	Actinium 89 Ac (227) 1.1 **	Rutherfordium 104 Rf (267) ---	Dubnium 105 Db (268) ---	Seaborgium 106 Sg (271) ---	Bohrium 107 Bh (272) ---	Hassium 108 Hs (270) ---	Meitnerium 109 Mt (276) ---	Darmstadtium 110 Ds (281) ---	Roentgenium 111 Rg (280) ---	Copernicium 112 Cn (285) ---	Ununtrium 113 Uut (284) ---	Flerovium 114 Fl (289) ---	Ununpentium 115 Uup (288) ---	Livermorium 116 Lv (293) ---	Ununseptium 117 Uus (294) ---	Ununoctium 118 Uuo (294) ---

*lanthanides	Cerium 58 Ce 140.12 1.1	Praseodymium 59 Pr 140.91 1.1	Neodymium 60 Nd 144.24 1.1	Promethium 61 Pm (145) 1.1	Samarium 62 Sm 150.36 1.2	Europium 63 Eu 151.97 1.1	Gadolinium 64 Gd 157.25 1.2	Terbium 65 Tb 158.93 1.1	Dysprosium 66 Dy 162.50 1.2	Holmium 67 Ho 164.93 1.2	Erbium 68 Er 167.26 1.2	Thulium 69 Tm 168.93 1.3	Ytterbium 70 Yb 173.04 1.1	Lutetium 71 Lu 174.97 1.1
**actinides	Thorium 90 Th 232.04 1.3	Protactinium 91 Pa 231.04 1.5	Uranium 92 U 238.03 1.4	Neptunium 93 Np (237) 1.4	Plutonium 94 Pu (244) 1.3	Americium 95 Am (243) 1.3	Curium 96 Cm (247) 1.3	Berkelium 97 Bk (247) 1.3	Californium 98 Cf (251) 1.3	Einsteinium 99 Es (252) 1.3	Fermium 100 Fm (257) 1.3	Mendelevium 101 Md (259) 1.3	Nobelium 102 No (258) 1.3	Lawrencium 103 Lr (262) ---

Answer Key
Testname: EXAM 1-S2024

1) A
2) C
3) A
4) E
5) C
6) A
7) C
8) A
9) B
10) B
11) B
12) E
13) C
14) A
15) A
16) C
17) D
18) D
19) B
20) D
21) A
22) A
23) D
24) C
25) B