

CHEMISTRY 101A  
Final Exam – Form A  
May 8, 2020  
McCarren

Name \_\_\_\_\_

Signature \_\_\_\_\_

Section \_\_\_\_\_

**"The important thing is not to stop questioning. Curiosity has its own reason for existing."**                      **Albert Einstein**

This exam contains 40 questions on 7 numbered pages. You have three hours to complete the exam. Work carefully and make sure you answer all questions.

1-40    (40 pts.)    \_\_\_\_\_

Useful Information:

1.000 L = 1000.0 mL

Always assume ideal behavior for gases (unless explicitly told otherwise).

$PV = nRT$

Density = mass / volume

$R = 0.08206 \text{ L}\cdot\text{atm}/\text{mol}\cdot\text{K}$

$K = ^\circ\text{C} + 273$

$^\circ\text{C} = (5/9)(T_F - 32^\circ\text{F})$

STP = standard temperature and pressure =  $0^\circ\text{C}$  and 1.00 atm

$N_A = 6.022 \times 10^{23}$

Solubility Rules:

1. Most nitrate salts are soluble.
2. Most salts of sodium, potassium, and ammonium cations are soluble.
3. Most chloride salts are soluble. Exceptions: silver(I), lead(II), and mercury(I) chloride.
4. Most sulfate salts are soluble. Exceptions: calcium, barium, and lead (II) sulfate.
5. Most hydroxide salts can be considered insoluble. Soluble ones: sodium, potassium, and calcium hydroxide.
6. Consider sulfide, carbonate, and phosphate salts to be insoluble. Soluble ones: sodium, potassium, and ammonium.

1A

1

H

Hydrogen

1.008

2A

3

Li

Lithium

6.941

4

Be

Beryllium

9.012

5

B

Boron

10.81

6

C

Carbon

12.01

7

N

Nitrogen

14.01

8

O

Oxygen

16.00

9

F

Fluorine

19.00

10

Ne

Neon

20.18

11

Na

Sodium

22.99

12

Mg

Magnesium

24.31

13

Al

Aluminum

26.98

14

Si

Silicon

28.09

15

P

Phosphorus

30.97

16

S

Sulfur

32.07

17

Cl

Chlorine

35.45

18

Ar

Argon

39.95

19

K

Potassium

39.10

20

Ca

Calcium

40.08

21

Sc

Scandium

44.96

22

Ti

Titanium

47.88

23

V

Vanadium

50.94

24

Cr

Chromium

52.00

25

Mn

Manganese

54.94

26

Fe

Iron

55.85

27

Co

Cobalt

58.93

28

Ni

Nickel

58.69

29

Cu

Copper

63.55

30

Zn

Zinc

65.38

31

Ga

Gallium

69.72

32

Ge

Germanium

72.59

33

As

Arsenic

74.92

34

Se

Selenium

78.96

35

Br

Bromine

79.90

36

Kr

Krypton

83.80

37

Rb

Rubidium

85.47

38

Sr

Strontium

87.62

39

Y

Yttrium

88.91

40

Zr

Zirconium

91.22

41

Nb

Niobium

92.91

42

Mo

Molybdenum

95.94

43

Tc

Technetium

(98)

44

Ru

Ruthenium

101.1

45

Rh

Rhodium

102.9

46

Pd

Palladium

106.4

47

Ag

Silver

107.9

48

Cd

Cadmium

112.4

49

In

Indium

114.8

50

Sn

Tin

118.7

51

Sb

Antimony

121.8

52

Te

Tellurium

127.6

53

I

Iodine

126.9

54

Xe

Xenon

131.3

55

Cs

Cesium

132.90

56

Ba

Barium

137.3

57

La

Lanthanum

138.9

58

Ce

Cerium

140.1

59

Pr

Praseodymium

140.9

60

Nd

Niodymium

144.2

61

Pm

Promethium

(145)

62

Sm

Samarium

150.4

63

Eu

Europium

152.0

64

Gd

Gadolinium

157.3

65

Tb

Terbium

158.9

66

Dy

Dysprosium

162.5

67

Ho

Holmium

164.93

68

Er

Erbium

167.3

69

Tm

Thulium

168.9

70

Yb

Ytterbium

173.0

71

Lu

Lutetium

174.97

72

Hf

Hafnium

178.5

73

Ta

Tantalum

180.9

74

W

Tungsten

183.9

75

Re

Rhenium

186.2

76

Os

Osmium

190.2

77

Ir

Iridium

192.2

78

Pt

Platinum

195.1

79

Au

Gold

197.0

80

Hg

Mercury

200.6

81

Tl

Thallium

204.4

82

Pb

Lead

207.2

83

Bi

Bismuth

209.0

84

Po

Polonium

(209)

85

At

Astatine

(210)

86

Rn

Radon

(222)

87

Fr

Francium

(223)

88

Ra

Radium

226

89

Ac

Actinium

(227)

90

Th

Thorium

232.04

91

Pa

Protactinium

231.04

92

U

Uranium

238.03

93

Np

Neptunium

(237)

94

Pu

Plutonium

(244)

95

Am

Americium

(243)

96

Cm

Curium

(247)

97

Bk

Berkelium

(247)

98

Cf

Californium

(251)

99

Es

Einsteinium

(252)

100

Fm

Fermium

(257)

101

Mn

Mendelevium

(258)

102

Nr

Nobelium

(259)

103

Lr

Lutetium

(262)

104

Rf

Rutherfordium

(261)

105

Db

Dubnium

(262)

106

Sg

Seaborgium

(263)

107

Bh

Bohrium

(262)

108

Hs

Hassium

(265)

109

Mt

Meitnerium

(266)

110

Ds

Darmstadtium

(269)

111

-

-

(272)

112

-

-

(277)

113

-

-

(284)

114

-

-

(285)

115

-

-

(289)

116

-

-

(289)

117

-

-

(293)

118

-

-

(294)

119

-

-

(294)

120

-

-

(294)

121

-

-

(294)

122

-

-

(294)

123

-

-

(294)

Lanthanides

Actinides