Prince Sultan University

Deanship of Educational Services

Department of General Sciences

COURSE DETAILS:

GENERAL CHEMISTRY 101	CHM101 MAJOR EXAM I
Semester:	Spring Semester -Term 182
Date:	Sunday /March 3rd /2019
Time Allowed:	60 minutes

STUDENT DETAILS:

Student Name:	
Student ID Number:	
Section:	

INSTRUCTIONS:

- You may use a scientific calculator that does not have programming or graphing capabilities. NO borrowing calculators.
- NO talking or looking around during the examination.
- NO mobile phones. If your mobile is seen or heard, your exam will be taken immediately.
- Show all your work and be organized.
- You may use the back of the pages for extra space, but be sure to indicate that on the page with the problem.

H[1] 1.000																	**He**[2] 4
Li[3] 6.941	**Be**[4] 9.012											**B**[5] 10.81	**C**[6] 12.01	**N**[7] 14.01	**O**[8] 16	**F**[9] 19	**Ne**[10] 20.18
Na[11] 22.99	**Mg**[12] 24.31											**Al**[13] 26.98	**Si**[14] 28.09	**P**[15] 30.97	**S**[16] 32.06	**Cl**[17] 35.45	**Ar**[18] 39.95
K[19] 39.10	**Ca**[20] 40.08	**Sc**[21] 44.96	**Ti**[22] 47.9	**V**[23] 50.94	**Cr**[24] 51.99	**Mn**[25] 54.94	**Fe**[26] 55.85	**Co**[27] 58.93	**Ni**[28] 58.71	**Cu**[29] 63.54	**Zn**[30] 65.37	**Ga**[31] 69.72	**Ge**[32] 72.59	**As**[33] 74.92	**Se**[34] 78.96	**Br**[35] 79.9	**Kr**[36] 83.8
Rb[37] 85.47	**Sr**[38] 87.62	**Y**[39] 88.91	**Zr**[40] 91.22	**Nb**[41] 92.91	**Mo**[42] 95.94	**Tc**[43] 99.91	**Ru**[44] 101.1	**Rh**[45] 102.91	**Pd**[46] 106.4	**Ag**[47] 107.87	**Cd**[48] 112.4	**In**[49] 114.8	**Sn**[50] 118.69	**Sb**[51] 121.75	**Te**[52] 127.6	**I**[53] 126.9	**Xe**[54] 131.3
Cs[55] 132.9	**Ba**[56] 137.3	**Lu**[71] 175.0	**Hf**[72] 178.5	**Ta**[73] 180.9	**W**[74] 183.85	**Re**[75] 186.2	**Os**[76] 190.2	**Ir**[77] 192.2	**Pt**[78] 195.1	**Au**[79] 196.97	**Hg**[80] 200.6	**Tl**[81] 204.37	**Pb**[82] 207.2	**Bi**[83] 208.98	**Po**[84] 210	**At**[85] 210	**Rn**[86] 222

Student's Mark
/15

1) ***(0.75 point)*** All of the following are characteristics of nonmetals except:

A) Very poor conductors of electricity
B) Appear in the upper right-hand corner of the periodic table
C) Tend to form positive ions in chemical reactions with metals
D) Often bond to each other by forming covalent bonds
E) Include specific groups in periodic table such as halides and noble gases.

2) ***(0.75 point)*** Which one of the following statements about atomic structure is ***false***?

A) An atom is mostly empty space.
B) Almost all of the mass of the atom is concentrated outside the nucleus.
C) The radius of the nucleus is negligible compared to the radius of the atom.
D) Protons and electrons are particles of the same approximate mass but opposite charge.
E) B and D.

3) ***(0.5 point)*** which of the following represents substance(s) with constant composition that can be broken down into elements by physical processes:

A) table salt (sodium chloride)
B) A solution of salt and water
C) Iron metal
D) Limestone (calcium carbonate)
E) A and B

4) ***(I.5 points)*** A piece of zinc with a mass of 12.14 g is submerged in 46.3 cm^3 of water in a graduated cylinder. The water level increases to 48.0 cm^3. The correct value for the density of zinc from these data is ***(Apply the rules of significant figures):***

A) 7.141 g/cm^3
B) 7.14 g/cm^3
C) 0.14 g/cm^3
D) 0.253 g/cm^3
E) 7.1 g/cm^3

5) ***(1.0 points)*** Analysis of 1L (liter) sample of drinking water shows that it contains 12 mg of sodium. Determine the amount of sodium that exists in 1 µL (micro liter) of this water sample?

A) $1.2\ x10^{-5}$ g
B) $8.33\ x10^{-8}$ g
C) 1.2 ng
D) 12 ng
E) 0.012 g

6) ***(1.0 points)*** Which of the following statements is (are) true?

A) $^{18}_{8}O$ and $^{19}_{9}F$ have the same number of neutrons.

B) $^{18}_{8}O^{2-}$ has the same number of electrons as $^{20}_{10}Ne$.

C) $^{14}_{6}C$ and $^{14}_{7}N$ are isotopes of each other because their mass numbers are the same.

D) A and B

E) A and C

7) ***(2.5 points)*** Fill in the blank:

A) The formula of ferrous nitride is……

B) The formula of Mercury (I) persulfide is……

C) The name of C_5H_{12} is…….....

D) The name of Cl_2O_7 is……....

E) The name of Aluminum acetate is……

8) ***(1.5 points)*** Glycerol is an alcohol that consists of carbon hydrogen and oxygen. Analysis of 50 g sample of glycerol shows that it contains 19.55 g of carbon, 4.36 g of hydrogen. Answer the following questions depending on the previous information about glycerol:

A) (0.5 point) Calculate the amount of oxygen that exists in another sample of glycerol that has a mass of 800 g?

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B) (1.0 point) Determine the molecular formula of glycerol, given that the molar mass of glycerol is 92 g/mol?

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9) ***(1.0 point)*** How many oxygen atoms are there in 1.75×10^{-9} g of $Ca_3(PO_4)_2$?

A) 2.72×10^{13}

B) 1.75×10^{-9}

C) 8.43×10^{15}

D) 1.36×10^{13}

E) 4.24×10^{11}

10) (1 points) A compound is composed of element X and hydrogen. Analysis shows the compound to be 80% X by mass, with three times as many hydrogen atoms as X atoms per molecule (number of H atoms = triple the number of X atoms). What is the identity of element X?

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11) given the following ***<u>unbalanced</u>*** chemical equation:

$$NBr_3 + NaOH \rightarrow N_2 + NaBr + HOBr$$

A) Balance the chemical equation:

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B) If 15.5 g of NBr_3 reacted with 2.8 g NaOH what is the limiting reactant (show calculations)?

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C) Calculate the mass of excess reactant remaining the end of the reaction?

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D) If 3.5 g of NaBr were collected at the end of the reaction calculate the percentage yield?

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E) The whole amount of sodium bromide, NaBr collected from the previous reaction was diluted by water to prepare 200 mL solution. Calculate the molarity of this solution?

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F) Calculate the amount of water that should be added to dilute the previous solution (part E) to 0.15 M?

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Scratch Paper