Question one: (5 marks)

Circle the best answer in the following questions

1) What is the number of protons and neutrons in a cation (Mn^{2+}) with mass number 55 and atomic number 25?

A.55 protons and 25 neutrons B. 30 protons and 30 neutrons

C. 25 protons and 30 neutrons D. 55 protons and 25 neutrons

2) What is the approximate percentage composition by mass of the element oxygen in the compound $Al_2(SO_4)_3$?

A. 31% B. 56% C. 14% D. 62%

3) Fe2O3(s) + 3CO(g) → 2Fe(s) + 3CO2(g)

When 2 moles of CO react completely with an excess of Fe_2O_3 according to the above equation, approximately how many moles of iron, Fe, are produced?

A. 2.6 B. 1.3 C. 3 D. 1

4) Which element is in a solid state

A. Ne B. Cl C. Mg D. CO

5) Which substance cannot be decomposed chemically?

A. carbon tetrachloride B. Potassium C. carbon dioxide D. air

6) Which sample represents a pure substance?

A. NaCl(aq) B. HCl(aq) C. $CO_2(g)$ D. orange juice

7) Which of the following isotopes has the lowest number of neutrons?

A.^{52}Cr B. ^{91}Zr C. ^{131}Xe D. ^{85}Rb

8) An element has the following relative abundances: X-34 15%, X-35 20%, X-36 65%. Which of the following is true?

A. The atomic mass of this element is closer to 34.1.

B. The atomic mass of this element is closer to 34.9.

C. The atomic mass of this element cannot be determined without knowing exactly what X is.

D. The atomic mass of this element is approximately 35.5.

9) Which two elements will display the most similar chemical properties?

A. Aluminum and nitrogen B. Iron and copper

C. Chlorine and iodine D. Lithium and calcium

10) When the following equation is balanced, the coefficient (b) for chlorine gas is _____

a $CH_3Cl(g)$ + b $Cl_2(g)$ → c $CH_2Cl_2(g)$ + d $H_2(g)$

A. 2 B. 1 C. 3 D. 4

Question Two: (5 marks)

Write true or false for each statement:

1) The name of the compound $CaCl_2$ is calcium trichloride. ……..

2) The molecular mass of CO is equal to 28 g. ……..

3) The Avogadro's number, 6.022×10^{23} is the number of atoms in 1 g of carbon-13…….

4) Isotopes contain same number of neutrons in their nucleus. ……

5) Al_2O_3 is a homogeneous mixture. …….

6) In a chemical reaction, the number of moles of reactants should be equal to the numbers of moles of the products. ……

7) A cup of tea is an example of pure substance. ……..

8) The limiting reactant is the product that is consumed first. ……..

9) The empirical formula of benzene ($C_6H_{12}O_6$) is CHO_2 ……

10) The theoretical yield is measured after the experiment. ……..

Question Three: (5 marks)

1 – Give an example of the followings: (1 marks)

a. pure substance……. b- Polyatomic anion……

c- molecular compound……. d. monoatomic cation……..

2 – How many aluminium atoms are present in 171 g of aluminium sulphate $Al_2(SO_4)_3$ (2 marks)

3 – Convert -73 K to degrees Celsius. (1 mark)

4- When reacting Carbon with oxygen gas, the theoretical yield is estimated to 36 grams. The experimental yield was 18 grams. What is the percentage yield of the reaction? (1 mark)

Question Four: (5 marks)

1) What is the mass of 6.02×10^{23} molecules of chlorine gas? (2 marks)

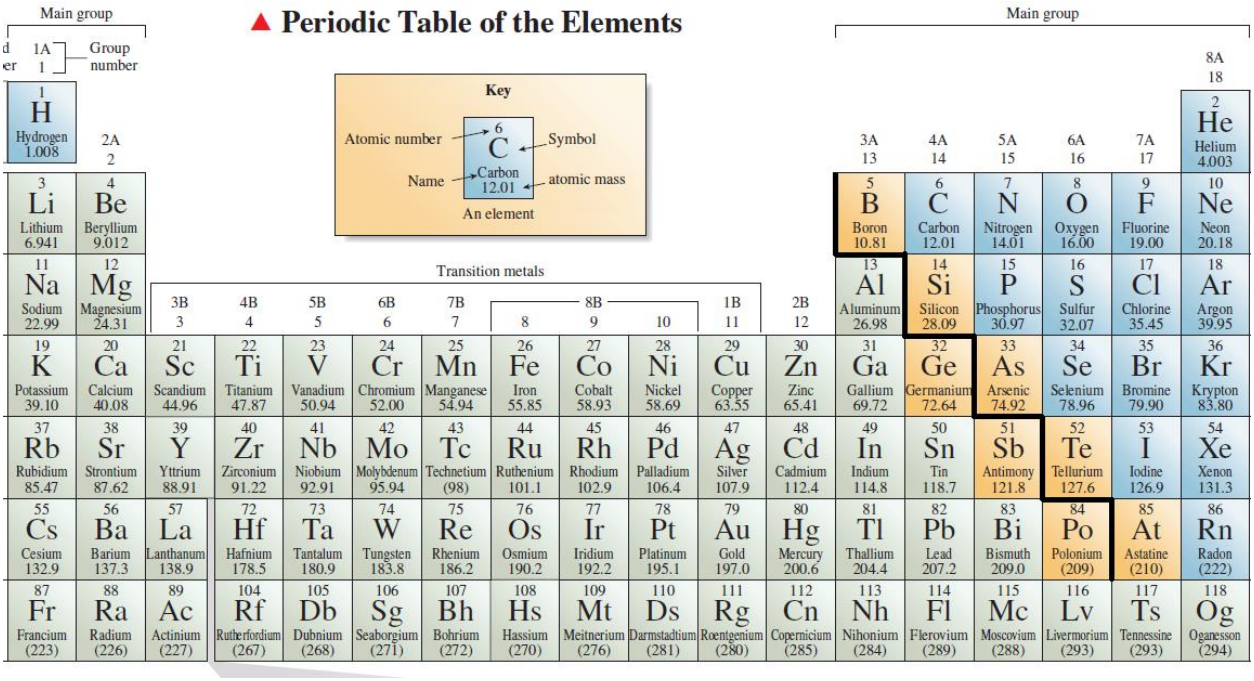
2) When 17 g of oxygen gas are reacted with 32 g of NH_3 according to the following reaction:

$$NH_3 + O_2 \rightarrow NO + H_2O$$ **(3 marks)**

a) Balance the chemical equation? (1 mark)

b) Determine the limiting reactant? (1 mark)

c) How many grams of H_2O are produced? (1 mark)


Periodic Table of the Elements
Main group
Group number
Key
Atomic number
Symbol
Name
atomic mass
An element
Transition metals
Main group
1 H Hydrogen 1.008
2 He Helium 4.003
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 47.87
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 65.41
31 Ga Gallium 69.72
32 Ge Germanium 72.64
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 132.9
56 Ba Barium 137.3
57 La Lanthanum 138.9
72 Hf Hafnium 178.5
73 Ta Tantalum 180.9
74 W Tungsten 183.8
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)
104 Rf Rutherfordium (267)
105 Db Dubnium (268)
106 Sg Seaborgium (271)
107 Bh Bohrium (272)
108 Hs Hassium (270)
109 Mt Meitnerium (276)
110 Ds Darmstadtium (281)
111 Rg Roentgenium (280)
112 Cn Copernicium (285)
113 Nh Nihonium (284)
114 Fl Flerovium (289)
115 Mc Moscovium (288)
116 Lv Livermorium (293)
117 Ts Tennessine (293)
118 Og Oganesson (294)

”””Good Luck”””