GRADE 11: REVIEW TEST

NAME: _____

(TOTAL SCORE = 80)

1. How many significant digits are there in each of the following measurements? (*½ mark each)*

a) 204.45 ha _____ b) 18.23 s _____

c) 380 000 _____ d) 0.00560 g _____

2. Name the following compounds (*½ mark each*).

a) SO_3 _____ b) NH_4OH _____

c) $CaSO_4$ _____ d) HCl (aq) _____

e) $H_2S0_{4\ (aq)}$ _____ f) $Sn_3(PO_4)_4 \bullet 6\ H_2O$ _____

3. Give the formula for each compound (½ *mark* each).

a) cupric nitrate _____ b) dintrogen trisulphide _____

c) magnesium carbide _____ d) ammonium phosphate _____

e) chromium (III) bromide _____ f) plumbous acetate _____

4. Write the complete, and short-hand electronic configuration (in terms of s, p, d) for *(1 mark each).*

a) $_{15}P$ _____

b) $_{26}F$ _____

5. Hydrogen has three isotopes: $^{1}_{1}H$, $^{2}_{1}H$, $^{3}_{1}H$. Give the number of **protons, neutrons** and **electrons** found in each isotope *(1 mark)*.

6. Express the answer to each of the following calculations with the **correct number of significant digits and using proper scientific notation.** *(1 mark each)*

a) 13.89cm + 6.7732 cm _____ b) 120 km^3 / 8.56 km _____

c) 3.0899 mm^2 x 22.4 mm _____ c) 3.3×10^{-6} m x 1.05×10^{2} m _____

7. Name the **family (Group)** of each of the following sets of elements *(½ mark each)*.

a) Li, Na,Rb,and Fr _____ h) Ne, Ar, Xe and Rn _____

c) Mg, Ca, Ba and Ra _____ d) F, Cl, and At _____

8. Which of the following elements will have the **largest** atomic radius? *(½mark each).*

a) Cs, K, or Li _____ b) F, B or Li _____

c) K^{+1}, Mg^{+1}, Al^{+3} _____ d) O, O^{-1}, O^{-2} _____

9. Which of the following will have the **smallest** first ionization potential energy? (½ *mark each).*

a) Li, B, F _____ b) Si, S, Sb _____

10. Explain the difference between electron affinity and electronegativity, give an **example** in each case. *(2 marks).*

11. Given the following combinations of elements and their electronegativities, state **what kind of bond** (ionic, polar covalent, or covalent) is formed, *(½ mark each).*

a) potassium (0.9) and chlorine (2.9) _____
b) hydrogen (2.1) and oxygen (3.5) _____
c) two sulphur atoms (2.4) _____
d) phosphorus (2.l) and chlorine (3.0) _____

12. Draw the Lewis structure for each of the following molecules and state the **shape** and indicate if the molecule is **polar or non-polar** (2 *marks each).*

a) chloroform, CH_3Cl b) boron trifluoride, BF_3 c) phosphorus trihydride, PH_3

13. Balance the following equations. Identify the type of reaction occurring (i.e. synthesis, decomposition, single displacement, double displacement). *(2 marks each).*

a) $\_\_\ Mg(OH)_{2\ (aq)} + \_\_\ HNO_{3\ (aq)} \longrightarrow \_\_\ Mg(NO_3)_{2\ (aq)} + \_\_\ H_2O_{\ (l)}$

b) $\_\_\ Al_{(s)} + \_\_\ NiCl_{2\ (aq)} \longrightarrow \_\_\ AlCl_{3\ (aq)} + \_\_\ Ni_{\ (s)}$

14. Write the **net ionic equation** for each of the equations in question 13 above. *(2 marks)* ....

15. i) Predict the products of the following double displacement reaction.
ii) Use your solubility tables to predict which of the, if any, would form precipitates and which would be soluble in water. Place the subscripts $_{(aq)}$ or $_{(s)}$ beside the appropriate formulas.
iii) Balance the chemical equation.
iv) Write the total dissociated ionic equation.
v) Write the net ionic equation. *(5 marks).*

__ $Al(OH)_{3\ (aq)}$ + __ $Na_2CO_{3\ (aq)}$ $\longrightarrow$ _____ + _____

16. Of the chemical substance listed below is a base, which is an acid, which is an organic compound and which will be good conductors of electricity? *(4 marks).*

CH_4 $MgCl_2$ CCl_4 HI KOH

17. Explain what is meant by a strong electrolyte and a weak electrolyte. Give an example of each. *(2 marks).*

18. i) How many moles in 5.00×10^2 g of iron? *(1mark)*

ii) How many iron atoms in 5.00×10^2 g of iron? *(1 mark).*

19. Calculate the mass of:

a) 1.50 moles of oxygen gas

b) 750 cm^3 of 0.015 mol dm^{-3} NaOH *(2 marks).*

20. The percentage composition of tartaric acid is: 32.01 % C, 4.03% H, and 63.96 % O. Given that the molecular mass of tartaric acid is 150 amu, determine its **molecular formula.** *(4 marks)*

21. When 0.952 g of an organic compound containing C, H, and O is burned completely in oxygen, 1.35 g of CO_2 and 0.826 g of H_2O are produced. What is the **empirical formula** of the compound? *(5 marks).*

22. Using the equation below, how many grams of ammonia will be formed if 75.0 g of nitrogen reacts with excess hydrogen? *(4 marks)*

$$N_{2\,(g)} + H_{2\,(g)} \longrightarrow NH_3 \qquad \textbf{(BALANCE ?)}$$

23. A mixture of 5.00 g of $H_{2\,(g)}$ and 10.0 g of $O_{2\,(g)}$ is ignited. Water forms according to the following equation: $2\,H_{2\,(g)} + O_{2\,(g)} \longrightarrow 2\,H_2O_{\,(g)}$

a) Which reactant is limiting?

b) How much water will be produced by the reaction? *(5 marks)*

24. The sulphide ore of zinc, ZuS, is reduced to elemental zinc by "roasting" it (heating it in air) to give ZnO and then heating the ZnO with carbon monoxide. The two reactions can be written as:

$$ZnS + 3/2\ O_2 \longrightarrow Z\,nO + SO_2$$

$$ZnO + CO \longrightarrow Zn + CO_2$$

Suppose 5.32 kg of ZnS is treated in this way and 3.30 kg of pure zinc, Zn, is obtained. Calculate the **theoretical yield of Zn** and its actual **percentage yield.** *(6 marks)*

25. Concentrated nitric acid, $HNO_{3\ (aq)}$ acts on copper to give nitrogen dioxide and dissolved copper ions according to the following balanced chemical equation ...

$$Cu_{(s)} + 4\ H^{+1}{}_{(aq)} + 2\ N0_3{}^{-1}{}_{(aq)} \longrightarrow 2\ NO_{2\ (g)} + Cu^{+2}{}_{(aq)} + 2\ H_2O_{(l)}$$

Suppose that 6.80 g of copper is consumed in this reaction and that the $NO_{2\ (g)}$ is collected at a pressure of 98.5 kPa and a temperature of 45° C. Calculate the **volume of $NO_{2\ (g)}$** produced. *(6marks)*

26. Calculate the heat required to order to raise the temperature of 24 kg of water from 13°C to 76°C. (Specific heat capacity of water c_{water} = 4200 J/kg •°C) (2 marks)

27. Name the following organic compounds: *(3 marks)*

a) $H_3C - CH_2 - CH_3$

(b) $CH_3 — CH_2 — \underset{\displaystyle CH_3}{\underset{|}{CH_2}} — CH_3$

(c) $CH_3 — \underset{\displaystyle CH_3}{\underset{|}{CH_2}} — CH_3$

(d) $H_2C == CH_2$

(e) $H_3C — CH_2 — CH == CH_2$

(f) $HC \equiv CH$

28. Draw the structures for the following organic compounds: *(2 marks)*

(a) 2,3– dimethyl butane

(b) 3,4,5— trimethylpentane

(c) propyne

d) propan – 2– ol

(e) 3-ethyl-2,2,5– trimethylheptane