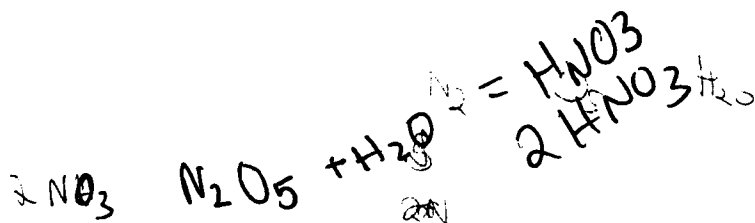


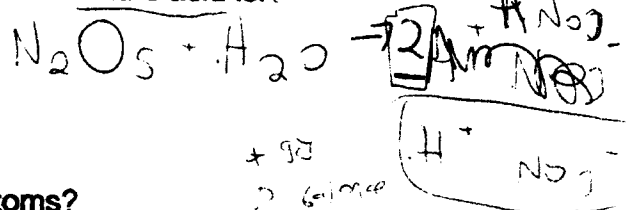
# \*Exam #1

12 20 Q's word, Rest easy



1. ✓ In the balanced equation for the reaction between dinitrogen pentoxide and water, forming nitric acid, the coefficient for nitric acid is:

(a) 4  
(b) 1  
(c) 2  
(d) 3



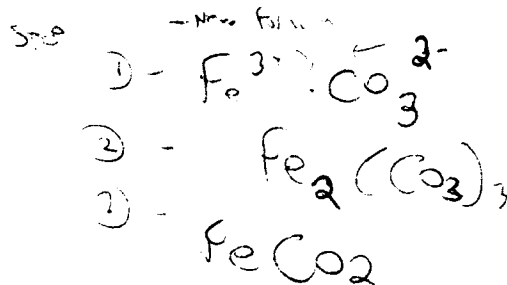
2. ✓ What is the mass of one mole of silicon atoms?

(a)  $6.022 \times 10^{23}$  g  
(b) 74.92 g  
(c) 14.04 g  
(d) 28.08 g

- Look at Periodic Table  
- Silicon

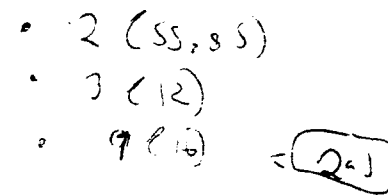
3. The formula mass of Iron(III) carbonate is given by:

(a) 291.72 g/mol  
(b) 115.81 g/mol  
(c) 139.85 g/mol  
(d) 287.55 mol/g



4. ✓ The correct name for  $\text{SF}_6$  is:

(a) Fluoride of sulfur  
(b) Monosulfur hexafluoride  
(c) Sulfur hexafluoride  
(d) Hexafluorosulfur



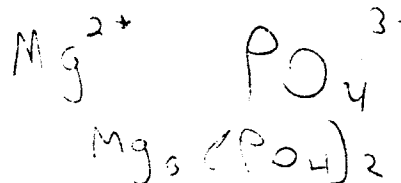
5. ✓ The formula for sulfate ion is:

(a)  $\text{H}_2\text{SO}_4$   
(b)  $\text{SO}_4^{2-}$   
(c)  $\text{HSO}_4^{2-}$   
(d)  $\text{HSO}_4^-$

reference

6. ✓ Magnesium phosphate has the formula:

(a)  $\text{Mg}_3(\text{PO}_4)_2$   
(b)  $\text{Mg}_2(\text{PO}_4)_3$   
(c)  $\text{Mg}_3\text{PO}_4$   
(d)  $\text{Mg}_3(\text{PO}_4)_3$



7. How many microliters are there in 265. L?

(a) 0.265  $\mu\text{L}$   
(b) 26.5  $\mu\text{L}$   
(c)  $2.65 \times 10^3 \mu\text{L}$   
(d)  $2.65 \times 10^8 \mu\text{L}$

- See 20 D.5

$$265 \times 10^6$$

$$2.65 \times 10^8$$

more. Less  
exp. ↑

8.

At a speed of 66.5 km per hour, how many seconds will it take to cover a distance of  $1.00 \times 10^3$  m?

(a)  $5.41 \times 10$  s

(b) 18.5 s

(c) 54,135 s

(d) 0.015 s

9.

If the density of a substance is 1.680 g/mL, what is the mass of  $9.200 \times 10^{-3}$  L of this substance?

(a) 9.200 mL

(b)  $1.546 \times 10$  g

(c)  $1.55 \times 10$  g

(d) 1.68 g

10.

A mass of 3.7 ng is also equal to:

(a)  $3.70 \times 10^{-9}$  g

(b)  $3.7 \times 10^{-9}$  g

(c)  $3.7 \times 10^{-9}$  g

(d)  $3.70 \times 10^{12}$  mg

11.

An anion  $X^{3-}$  contains 10 electrons. The number of protons in the neutral atom (from which the anion is formed) is given by:

(a) 10

(b) 3

(c) 7

(d) 13

12. ✓

A neutral atom contains 82 protons and has a mass number of 207. The number of neutrons in the atom is:

(a) 125

(b) 82

(c) 207

(d) 289

13.

An atom with 80 protons, 80 electrons and 121 neutrons represents an atom of:

(a) Pb

(b) Sb

(c) Nb

(d) Hg

- 14/ You are driving on a highway with a posted speed limit of 100 km/hr. Your speedometer indicates a speed of 95 miles/hr. If 1 km = 0.62 mile, are you driving:
- (a) Below the speed limit  
 (b) Above the speed limit  
 (c) At the posted limit  
 (d) None of the above
15. ✓ The correct answer (expressed in scientific notation) for the calculation,  $229.56 \text{ g} + 123.345 \text{ g} + 13.2 \text{ g}$  is:
- (a) 366.105 g  
 (b)  $3.661 \times 10^2 \text{ g}$   
 (c) 366.1 g  
 (d)  $3.7 \times 10^2 \text{ g}$
16. The largest volume is represented by:
- (a) 1.0 L  
 (b) 1000 mL  
 (c)  $1.0 \times 10^5 \mu\text{L}$   
 (d)  $1.0 \times 10^4 \text{ cm}^3$
17. ✓ After performing a calculation, Fred's calculator displayed the result as 5.35961. If the answer can have only three significant figures and must be expressed using scientific notation, it should be reported as:
- (a)  $5.36 \times 10^0$   
 (b)  $0.535 \times 10$   
 (c) 5.36  
 (d) 53.6/10
18. In the Periodic Table, the rare gases are in the same
- (a) Period  
 (b) Group  
 (c) Section  
 (d) Row
19. ✓ An element containing 33 electrons is a:
- (a) Metal  
 (b) Non-metal  
 (c) Metalloid  
 (d) None of the above

20. ✓ One mole of hydrogen atoms contains:
- (a) 1 atom of hydrogen
  - (b)  $6.022 \times 10^{23}$  atoms of hydrogen
  - (c)  $6.022 \times 10^{-23}$  atoms of H
  - (d) 1 g of hydrogen

The mass of an empty container is 15.096 g. A solid is then placed in the container. The combined mass of the solid and the container is 15.119 g. How many significant figures are there in the calculated mass of the solid?

- (a) 5
- (b) 4
- (c) 3
- (d) 2

$$\begin{array}{r} 15.119 \\ - 15.096 \\ \hline 0.023 \end{array}$$

15.119  
15.096  
0.023

- ✓ Workers have a right to:
- (a) Work in a safe and healthy environment
  - (b) Know the processes and substances they are working with
  - (c) Know the potential hazards from the substances and the processes
  - (d) All of the above

23. The mere presence of a toxic agent constitutes a hazard. It is hazardous in all circumstances.

- (a) True
- (b) False

24. ✓ A mountain climber at an altitude of 6000 meters may be subjected to pressure conditions described as:

- (a) Atmospheric
- (b) Hyperbaric
- (c) Hypobaric
- (d) Hyperatmospheric

25. ✓ Hazard posed by exposure to radiation is classified as:

- (a) Chemical
- (b) Biological
- (c) Ergonomic
- (d) Physical

- ✓ Hazard posed by exposure to a virus is classified as:

- (a) Chemical
- (b) Biological
- (c) Ergonomic
- (d) Physical

27. Ergonomic stresses arise because of optimal adjustment between the worker and the work or workplace.  
(a) True  
(b) False
28. Which of the following statement is true for acute toxicity?  
(a) Results from brief exposure to high concentrations of the contaminant  
(b) Responses generally have latency periods  
(c) Responses are difficult to observe and relate  
(d) Results from low and repeated exposure over a long period of time
29. WHMIS was implemented with the goal to:  
(a) Increase the incidence of illnesses and injuries caused by the hazardous materials in the workplace  
(b) Catch those who pollute the environment  
(c) Collect more taxes  
(d) None of the above

Chemicals causing cancer are classified as:

- (a) Asphyxiants  
(b) Carcinogens  
(c) Teratogens  
(d) Mutagens
31. Extremely fine particles of lead oxide formed during welding (a high temperature process) are an example of:  
(a) Vapor  
(b) Fume  
(c) Smoke  
(d) Mist
32. Commonly used units of concentration for gases and vapors in air are:  
(a) ppm  
(b) ppb  
(c) %  
(d) All of the above
33. Toxicity of air contaminants is determined by:  
(a) Humans population studies  
(b) Animals studies  
(c) Bacterial studies  
(d) All if the above
- if not, use ppm

34. A concentration of 31.0 ppb for a gas in air is equal to:

(a)  $3.1 \times 10^{-3}\%$   
 (b)  $3.10 \times 10^{-6}\%$   
 (c)  $3.1 \times 10^{-5}\%$   
 (d)  $3.10 \times 10^{-3}\%$

$31.0 \times 10^{-3} \times 10^{-4}$   
 $31.0 \times 10^{-7}$

$31 \times 10^{-3} \text{ ppm} / 100$   
 $3.1 \times 10^{-2} \text{ ppm}$

35. The concentration of  $\text{SO}_2$  in air near a paper mill is 25. ppb, what will it be in ppm?

(a)  $2.50 \times 10^3 \text{ ppm}$   
 (b)  $2.5 \times 10^{-2} \text{ ppm}$   
 (c)  $2.5 \times 10^3 \text{ ppm}$   
 (d)  $2.5 \times 10^{-9} \text{ ppm}$

$25 \times 10^{-3}$   
 $2.5 \times 10^{-2}$

$25 = 25 \times 10^3$   
 $2.5 \times 10^2$

36. Based upon TLV-TWA values (given in parentheses), which of the following gas poses the most risk:

(a) Carbon monoxide (50 ppm)  
 (b) Ozone (100 ppb)  
 (c) Carbon dioxide ( $5.0 \times 10^3 \text{ ppm}$ )  
 (d) Nitrogen dioxide ( $3.0 \times 10^3 \text{ ppb}$ )

$100 \times 10^{-3} = 0.1 \text{ ppm}$   
 $3.0 \times 10^3 \times 10^{-3} = 3$

37. Hydrogen bonds in water are:

(a) Weaker than covalent bonds  
 (b) Stronger than covalent bonds  
 (c) Of the same bond strength  
 (d) None of the above

38. The formation of sulfuric acid in the atmosphere is due to the reactions of:

(a)  $\text{NO}_x$   
 (b)  $\text{SO}_x$   
 (c) CO  
 (d)  $\text{SO}_4^{2-}$

39. A worker is repeatedly exposed to a concentration of  $9.5 \times 10^3 \text{ ppb}$  of a substance. If the TLV-TWA for the substance is 12.5 ppm, it is a safe work environment for the worker.

(a) True  
 (b) False

below Threshold (exposed to 9.5 ppm)

40. The presence of hydrogen bonding in water accounts for its:  
(a) Taste  
(b) Exceptionally high heat of vaporization  
(c) Odor  
(d) None of the above
41. The burning of fossil fuels to generate energy is mainly responsible for the production of  $\text{NO}_x$ .  
(a) True  
(b) False
42. Which of the following factor(s) influence the intensity of toxic action?  
(a) Age  
(b) Environmental factors  
(c) Host factors  
(d) All of the above
43. On the basis of physiological action, gaseous carbon monoxide is classified as an:  
(a) Irritant  
(b) Asphyxiant  
(c) Anaesthetic  
(d) None of the above
44. Hepatotoxins are substances that affect the liver.  
(a) False  
(b) True
45. WHMIS was developed through the collective efforts of Labor, Industry, and Federal/Provincial/Territorial Governments.  
(a) True  
(b) False
46. The abbreviation WHMIS stands for:  
(a) Workers House and Money Investment Society  
(b) Workplace Hazardous Materials Information System  
(c) Workplace Hazardous Machinery Indicator System  
(d) Workers Hazardous Materials Inventory System

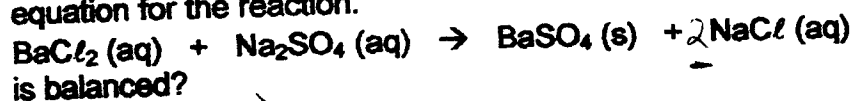
47. Toxic hazards posed by a substance depend upon:

- (a) Exposure dose
- (b) Individual susceptibility
- (c) Synergistic and other effects
- (d) All of the above

SO<sub>x</sub> represents:

- (a) SO<sub>3</sub> only
- (b) Mixture of SO<sub>2</sub> and SO<sub>3</sub>
- (c) Droplets of H<sub>2</sub>SO<sub>4</sub>
- (d) Particles of sulfate salts

49. What are the coefficients for the reactants and the products when the equation for the reaction:



- (a) 1, 1, 1, 1
- (b) 1, 1, 1, 2
- (c) 2, 2, 2, 4
- (d) 2, 2, 2, 2

Susan saw three dogs in his backyard. The number has:

- (a) one significant figure
- (b) three significant figures
- (c) Infinite number of significant figures
- (d) Two significant figures

51

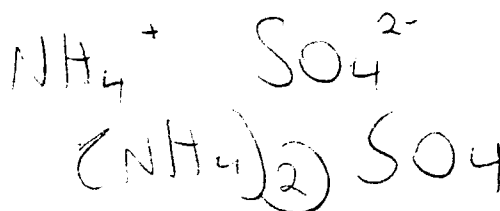
What is the coefficient for water when the equation for the reaction:  
 $\text{C}_2\text{H}_5\text{OH} + 3\text{O}_2 \rightarrow 2\text{CO}_2 + 3\text{H}_2\text{O}$   
is balanced?

- (a) 2
- (b) 3
- (c) 1
- (d) 6

52.

How many moles of ammonium ions are formed when one mole of ammonium sulfate (an ionic compound) is dissolved in water?

- (a) 1
- (b) 3
- (c) 2
- (d) 4

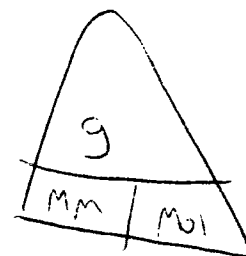




$$\frac{10.0 \times 10^{-6}}{45.98} = 2.17 \times 10^{-7}$$

53. How many moles are there in 10.0  $\mu\text{g}$  of nitrogen dioxide (molar mass = 45.98 g/mol)?

(a)  $2.17 \times 10^{-4}$   
 (b)  $2.17 \times 10^{-2}$   
 (c)  $2.17 \times 10^{-7}$   
 (d)  $4.59 \times 10^2$



54. The O-H bonds in water are:

(a) Covalent  
 (b) Ionic  
 (c) Nonbonding  
 (d) None of the above

Non-metal & Non-metal covalent

55. The statistical estimate of dose that would cause death in 50% of the subjects is defined as  $\text{LD}_{50}$ .

(a) True  
 (b) False

56. Which of the following statement is true for acute toxicity?

(a) Much more difficult to study  
 (b) Results from brief exposure to high contaminant levels  
 (c) May have latency periods  
 (d) Results from low and repeated exposure over a long period of time

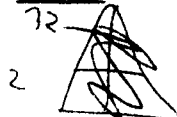
Hazard posed by  $\text{HNO}_3$  is classified as:

- chemical

(a) Ergonomic  
 (b) Biological  
 (c) Physical  
 (d) Chemical

58. How many moles of sulfur are there in 64.12 g of sulfur?

(a) 1.000 mole  
 (b) 2.000 moles  
 (c)  $5.000 \times 10^{-1}$  mole  
 (d) 3.000 moles



moles = 2

1 mole = 32  
 Table

Carbon-carbon double bond in organic compounds is formed by the sharing of:

(a) One pair of electrons  
 (b) Two pairs of electrons  
 (c) Loss and gain of electrons  
 (d) Three pairs of electrons

60. Organic polymers containing long chain structures are common because carbon can form covalent bonds with other carbon atoms.

(a) True

(b) False

61. The functional group in an alcohol is:

(a) -SH

(b) -NH<sub>2</sub>

(c) -OH

(d) None of the above

The compound with the formula  $\text{CH}_3(\text{CH}_2)_3\text{NH}_2$  is an:

(a) Amine

(b) Ether

(c) Ester

(d) Alcohol

63. The compound with the formula  $\text{CH}_3\text{CH}_2\text{OCH}_2\text{CH}_3$  is an:

(a) Ether

(b) Ester

(c) Alcohol

(d) None of the above

64. How many carbon atoms are there in a compound with the formula  $\text{CH}_3(\text{CH}_2)_4\text{CH}_3$ ?

(a) 8

(b) 14

(c) 6

(d) 10

How many hydrogen atoms are there in a compound with the formula  $\text{CH}_3(\text{CH}_2)_5\text{COOC}_2\text{H}_5$ ?

(a) 9

(b) 18

(c) 2

(d) 29

How many oxygen atoms are there in a compound with the formula  $\text{HOCH}_2(\text{CH}_2)_2\text{COOC}_3\text{H}_7$ ?

(a) 7

(b) 14

(c) 10

(d) 3

3 or 4 kind

67. Benzene has a ring structure containing three carbon-carbon double bonds.

(a) True

(b) False

Interaction of high energy with atmospheric oxygen leads to the formation of ozone.

(a) True

(b) False

Using non-fossil energy sources is a suggested way to control global warming.

(a) True

(b) False

70. The abbreviation VOCs stands for:

(a) Volume of Contaminants

(b) Victory over Contaminants

(c) Volatile Organic Complexes

(d) Volatile Organic Compounds

71. Iron is a:

(a) Transition metal

(b) Metalloid

(c) Halogen

(d) Non-metal

— mid of Table

72. The corrosion product of iron has the formula:

(a) Fe

(b)  $\text{Fe}_2\text{O}_3$

(c)  $\text{O}_2$

(d)  $\text{CaCO}_3$

React with oxygen

Acid precipitation plays no role in the damage to forests.

(a) True

(b) False

74. Weakly acidic nature of rain is due to the formation of:

(a)  $\text{O}_2$  (g)

(b)  $\text{N}_2$  (g)

(c)  $\text{H}_2\text{CO}_3$  (aq)

(d)  $\text{O}_3$  (g)

— Acid —

"H"

— starts with


75. The pH of a wastewater sample is measured to be 11.9. The sample is:
- (a) Acidic
  - (b) Neutral
  - (c) Basic
  - (d) None of the above
- 17

76. The pH value for an aqueous solution of nitric acid should be:
- (a) Higher than 7.0
  - (b) Lower than 7.0
  - (c) Equal to 7.0
  - (d) Equal to 11.5

77. A water sample shows a pH of 7.0. The sample is:
- (a) Acidic
  - (b) Neutral
  - (c) Colorless
  - (d) Basic

The solubility of aluminum at a pH of 7.0 is lower than at a pH of 3.2.

- (a) True
- (b) False



79. Which compound reacts with an acid to generate carbon dioxide gas?
- (a)  $\text{H}_2\text{O}$  (l)
  - (b)  $\text{CaCO}_3$  (s)
  - (c)  $\text{NaBr}$  (aq)
  - (d)  $\text{SO}_2$  (g)

Solar energy is an example of a:

- (a) Fossil energy source
- (b) Non-fossil energy source
- (c) No energy source
- (d) Nuclear energy source

81. One of the gases responsible for global warming is:
- (a) CO
  - (b)  $\text{N}_2\text{O}$
  - (c)  $\text{N}_2$
  - (d)  $\text{O}_2$
- $\text{CO}_2$        $\text{CH}_4$

82. One of the suggested ways to control global warming is to:

- (a) Increase CO<sub>2</sub> emissions
- (b) Use more fossil fuels
- (c) Destroy CO<sub>2</sub> sinks
- (d) Conserve energy

Oxygen/Ozone screen in the stratosphere blocks much of the solar UV radiation.

- (a) True
- (b) False

84. The agreement to reduce and ultimately ban the manufacture and use of chlorofluorocarbons goes by the name of:

- (a) Kyoto Protocol
- (b) Glen Eagle Agreement
- (c) Montreal Protocol
- (d) Geneva Convention

The depletion of stratospheric ozone is caused by:

- (a) Natural sources only
- (b) Human-made sources only
- (c) Both natural and human-made sources
- (d) None of the above

Always

86. The major causes of ozone destruction include:

- (a) Water vapor
- (b) Nitric oxide
- (c) CFCs
- (d) All of the above

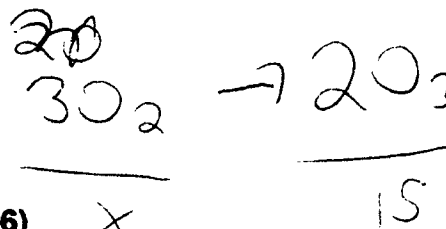
87. Adverse effects of acid rain on the aquatic life are due to:

- (a) Increase in pH
- (b) Decrease in pH
- (c) Decrease in aqueous concentrations of Al
- (d) Decrease in aqueous concentrations of Pb

Reduce pH

88. If under a set of optimum conditions, 2.00 moles of gaseous ozone are produced from 3.00 moles of oxygen gas, how many moles of oxygen gas will be required (under similar conditions) to produce 15.0 moles of gaseous ozone?

- (a) 15.0 moles
- (b) 45.0 moles
- (c) 30.0 moles
- (d) 22.5 moles



CHEM/CHEZ 208 XX (Deferred Exam. Summer 2006)

$$\frac{2}{x} = \frac{2}{15} \quad \Rightarrow \quad \frac{2x}{15} = \frac{2}{15} \quad \Rightarrow \quad 2x = 45 \quad \Rightarrow \quad x = 22.5$$

89. The reaction of limestone with  $\text{H}_2\text{SO}_4$  (aq) generates gaseous:

- (a) Carbon dioxide
- (b) Sulfur dioxide
- (c) Carbon monoxide
- (d) Sulfur trioxide

\* monoxide

90. Benzene contains:

- (a) Single bonds only
- (b) Double bonds only
- (c) Triple bonds only
- (d) Single and double bonds

3 Single

3 Double

91. The increased intensity of ground-level UV due to ozone depletion may lead to higher probability (in case of humans) of:

- (a) Deafness
- (b) Depression
- (c) Cataracts
- (d) AIDS

\* and Skin Cancer

92. Hazard posed by exposure to an oxidizing agent is classified as:

- (a) Chemical
- (b) Biological
- (c) Ergonomic
- (d) Physical

The combined interaction of  $\text{O}_3/\text{O}_2$  in the stratosphere with solar radiation protects us from the harmful effects of:

- (a) IR radiation
- (b) UV radiation
- (c) Visible radiation
- (d) Microwave radiation

The symbol for the rare gas in the same period as sodium is:

- (a) Mg
- (b) S
- (c) Ar
- (d) Cl

Period = Row

period 1800s

y 8

zone near y 16

O<sup>2-</sup>

Gen of 1887

95. The oxide ion contains:

- (a) 8 protons and 8 electrons
- (b) 8 protons and 10 electrons
- (c) 8 protons and 5 electrons
- (d) 8 protons and 6 electrons

96. In the implementation of WHMIS, suppliers must provide hazard information through:
- (a) Telephone calls
  - (b) e-Mails
  - (c) MSDSs only
  - (d) Labels and MSDSs
97. Serious damage to lungs may occur on exposure to:
- (a)  $O_2$  (g)
  - (b)  $NO_2$  (g)
  - (c)  $N_2$  (g)
  - (d)  $CO_2$  (g)
98. Risk characterization integrates the exposure and effects components to estimate the risk.
- (a) True
  - (b) False

The organization responsible for developing TLVs is abbreviated as:

- (a) AGCIH
- (b) ACGIH
- (c) AHGIC
- (d) ACGHI

X know

Which of the following is a greenhouse gas?

- (a) Nitrogen
- (b) Oxygen
- (c) Methane
- (d) None of the above

CH<sub>4</sub>