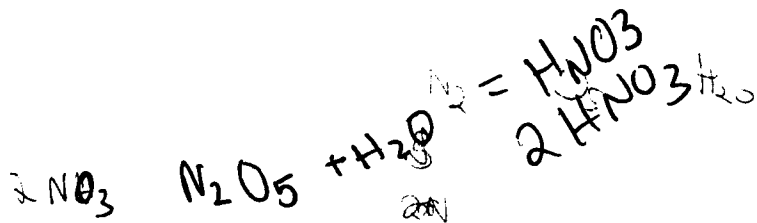




MP Exam Summer 2006, questions and answers - Exam 3

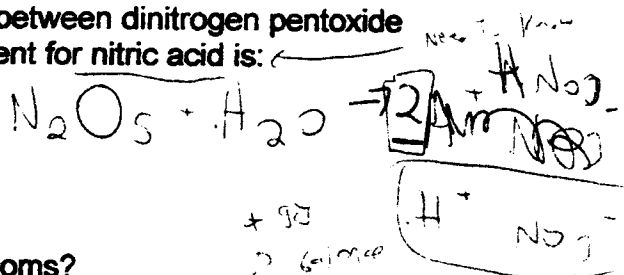
Chemistry in Our Lives (Concordia University)

**\*Exam #1**



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



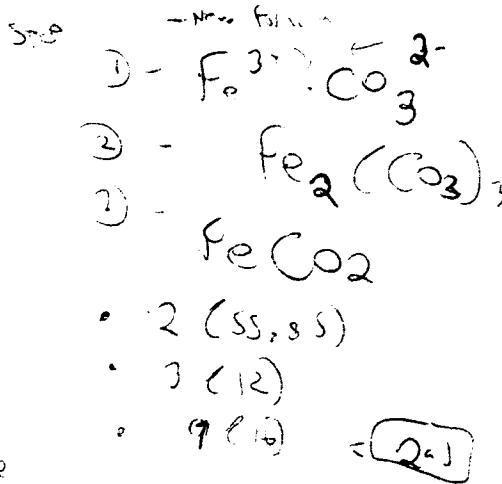
2 ✓ What is the mass of one mole of silicon atoms?

- (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 SF<sub>6</sub> is:

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

- start with 'S'

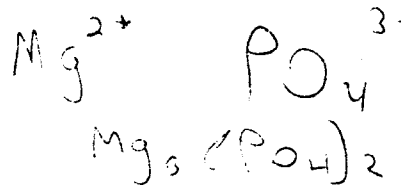
5 ✓ The formula for sulfate ion is:

- (a) H<sub>2</sub>SO<sub>4</sub>
- (b) SO<sub>4</sub><sup>2-</sup>**
- (c) HSO<sub>4</sub><sup>2-</sup>
- (d) HSO<sub>4</sub><sup>-</sup>

reference

6 ✓ Magnesium phosphate has the formula:

- (a) Mg<sub>3</sub>(PO<sub>4</sub>)<sub>2</sub>**
- (b) Mg<sub>2</sub>(PO<sub>4</sub>)<sub>3</sub>
- (c) Mg<sub>3</sub>PO<sub>4</sub>
- (d) Mg<sub>3</sub>(PO<sub>4</sub>)<sub>3</sub>



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

- (a) 0.265 μL
- (b) 26.5 μL
- (c)  $2.65 \times 10^3$  μL
- (d)  $2.65 \times 10^8$  μL**

- See 20.0.5

$$265 \times 10^6$$

$$2.65 \times 10^8$$

move. L: exp ↑

1000 h = 1 m

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



$$\frac{1 \text{ km}}{66.5} = 0.015 \text{ h/s}$$

$\times 60 \text{ min}$   
 $\times 60 \text{ s}$

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



$$3.7 \times 10^{-9}$$

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

$$10 - 3 = 7$$

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

$$N = \text{Dis.} - \text{Proton \#}$$

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

- (a) Pb
- (b) Sb
- (c) Nb
- (d) Hg

↓ look up 80 on periodic table

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

-convert 100 km to miles  
 $100 \text{ km} \times 0.62 \frac{\text{mi}}{\text{km}} = 62 \text{ mi}$   
 hr

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)  $3.7 \times 10^2 \text{ g}$**

x not sci notation  
 - add 1 sig fig

16. The largest volume is represented by:

- (a) 1.0 L
- (b) 1000 mL
- (c)  $1.0 \times 10^5 \mu\text{L}$
- (d)  $1.0 \times 10^4 \text{ cm}^3$**

$\mu = 10^{-6}$   
 $\text{cm}^3 \rightarrow \text{big}$

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)  $53.6/10$

only 3 sig notation  
 5.36

18. In the Periodic Table, the rare gases are in the same

- (a) Period
- (b) Group**
- (c) Section
- (d) Row

→ column

19. ✓ An element containing 33 electrons is a:

- (a) Metal
- (b) Non-metal
- (c) Metalloid**
- (d) None of the above

look up 33  
 AS → 116 metalloid

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

I know

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

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

TLV  
 High ↑  
 Low ↓

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

Trick one

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

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

35 + 95

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)  $3.1 \times 10^{3}\%$
- (d)  $3.10 \times 10^{-3}\%$

$31.0 \times 10^{-3} \times 10^{-4}$   
 $31.0 \times 10^{-7}$   
 $\rightarrow 3.10 \times 10^{-6}$

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 ( $3.0 \times 10^3 \text{ ppb}$ )

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

Worst case

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)  $\text{SO}_4^{2-}$

Sox

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 TLV-TWA (exposed to 12.5 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

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

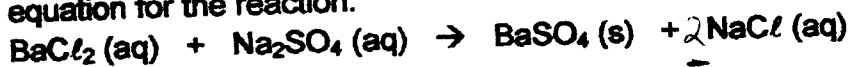
47. Toxic hazards posed by a substance depend upon:

- (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:



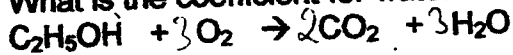
is balanced?

- (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:

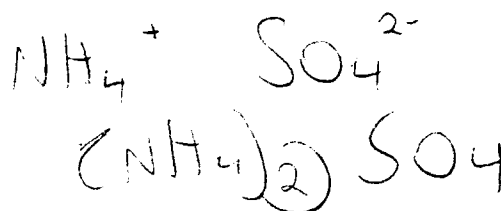


is balanced?

- (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?

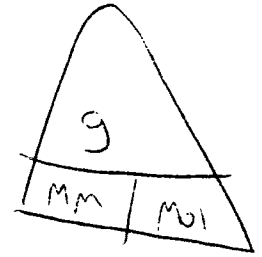
- (a) 1
- (b) 3
- (c) 2
- (d) 4



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

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  $LD_{50}$ .

- (a) True
- (b) False

know x

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

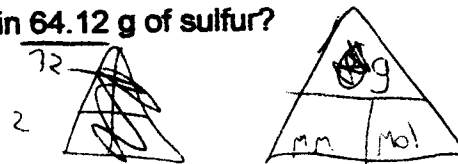
Hazard posed by  $\text{HNO}_3$  is classified as:

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

- 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  
look on 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

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

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

- (a) True  
(b) False

True

in some cases

61. The functional group in an alcohol is:

- (a) -SH  
(b) -NH<sub>2</sub>  
(c) -OH  
(d) None of the above

False

AMC

The compound with the formula CH<sub>3</sub>(CH<sub>2</sub>)<sub>3</sub>NH<sub>2</sub> is an:

- (a) Amine  
(b) Ether  
(c) Ester  
(d) Alcohol

is not middle

63. The compound with the formula CH<sub>3</sub>CH<sub>2</sub>OCH<sub>2</sub>CH<sub>3</sub> 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 CH<sub>3</sub>(CH<sub>2</sub>)<sub>4</sub>CH<sub>3</sub>?

- (a) 8  
(b) 14  
(c) 6  
(d) 10

How many hydrogen atoms are there in a compound with the formula CH<sub>3</sub>(CH<sub>2</sub>)<sub>5</sub>COOC<sub>2</sub>H<sub>5</sub>?

- (a) 9  
(b) 18  
(c) 2  
(d) 29

How many oxygen atoms are there in a compound with the formula HOCH<sub>2</sub>(CH<sub>2</sub>)<sub>2</sub>COOC<sub>3</sub>H<sub>7</sub>?

- (a) 7  
(b) 14  
(c) 10  
(d) 3

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

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)  $Fe_2O_3$
- (c)  $O_2$
- (d)  $CaCO_3$

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)  $O_2$  (g)
- (b)  $N_2$  (g)
- (c)  $H_2CO_3$  (aq)
- (d)  $O_3$  (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

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)  $H_2O$  (l)  
**(b)  $CaCO_3$  (s)**  
(c)  $NaBr$  (aq)  
(d)  $SO_2$  (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)  $N_2O$**   
(c)  $N_2$   
(d)  $O_2$

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

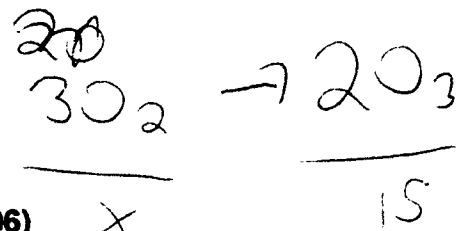
*Not Always*

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**



*Handwritten:* Hand

*Handwritten:*

$$\begin{array}{r}
 2x = 45 \\
 \hline
 1x = 22.5
 \end{array}$$

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

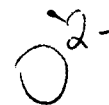
Know  
\* tricky

period 1930s

y 8

zone near  
y 16

Period = Row



Gen of 1932 etc

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

Tricky  
\*

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

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<sub>2</sub> (g)
  - (b) NO<sub>2</sub> (g)
  - (c) N<sub>2</sub> (g)
  - (d) CO<sub>2</sub> (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>