



# ENVIRONMENTAL CHEMISTRY



*Environmental Monitoring*

## UNIT EXAM

### Bonus Question # 46

This is an example of what kind of household hazard information label ...

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#### **Toilet Bowl Cleaner**

**DANGER:** Corrosive — produces chemical burns. Contains Hydrochloric Acid. Do not get in eyes, or on skin or clothing. May be harmful or fatal if swallowed. Do not breathe vapor or fumes. Keep out of reach of children. Fumes are corrosive to metal.

**STORAGE AND DISPOSAL:** Store in original container out of reach of small children. Keep securely closed in a cool, well-ventilated area. Do not reuse empty container. When empty, discard in trash or recycle.

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- A. ECOLABEL
- B. MSDS LABEL
- C. WHMIS LABEL
- D. ENERGUIDE LABEL



# Environmental Chemistry

## Unit C - UNIT TEST

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DO NOT MARK ON THIS TEST - YOUR ANSWERS GO ON THE SCANTRON ANSWER SHEET

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- Materials which can harm living things and do not occur naturally in the environment are called ...
  - Toxic
  - Furons
  - Phosphates
  - Pollutants**
- The Bayer Company, from Germany, used Willow Tree Bark in 1898, to produce a synthetic derivative chemical that helps to relieve suffering. The product they produced was ...
  - St. John's Wort
  - Echinacea
  - Aloe Vera
  - Aspirin**
- A refrigeration coolant, Freon gas, used in the refrigeration unit in a transport vehicle, is a potential contributor to ...
  - noise pollution
  - thermal pollution
  - vehicle exhausts
  - ozone depletion**
- Sometimes the use of a chemical can do more harm than good. When this occurs there can be opposing views about whether to continue using the chemical. This is called ...
  - a life situation
  - an issue**
  - an environmental action
  - a viewpoint
- To avoid waste chemicals dissolving or corroding some items in a sanitary landfill site, this is used ...
  - gravel and bacteria
  - gravel and compacted soil
  - plastic liner and compacted clay**
  - biodegradable liner and pebbles
- Fossil fuels are burned in barbecues, homes, vehicles and industrial plants. When this happens large amounts of carbon dioxide and water vapour are produced. The combustion reaction in a barbecue is represented by the following formula ...
  - $C_3H_8 + 5O_2 \rightarrow 3CO_2 + 4H_2O + \text{energy}$**
  - $CO_2 + 2H_2O \rightarrow CH_4 + 2O_2 + \text{energy}$
  - $CH_2 + H_2 \rightarrow CO_2 + O_2 + \text{energy}$
  - $C_3H_8 + 4H_2O \rightarrow 3CO_2 + 5O_2 + \text{energy}$
- Natural gas may contain hydrogen sulfide, a poisonous chemical. If natural gas does not contain hydrogen sulfide it is considered to be ...
  - harmful
  - corrosive
  - sour
  - sweet**



8. Testing various substances in the lab resulted in the collection of the following data. By using a few drops of universal indicator, the solutions all changed color. Those solutions that changed to a dark blue were identified as ...
- A. weak acids
  - B. weak bases
  - C. strong acids
  - D. strong bases
9. Because they are important and needed in relatively large amounts, certain elements found in the environment are called 'macronutrients'. Which of the following is NOT a macronutrient?
- A. Mercury
  - B. Nitrogen
  - C. Calcium
  - D. Phosphorus
10. Selenium is a micronutrient that is necessary, along with Vitamin E, to help protect cell membranes from damage caused by hydrogen peroxide. If the optimum amount of selenium is not available (a deficiency), humans may contract diseases such as ...
- A. Scurvy and high blood pressure
  - B. Cancer and heart disease
  - C. Hydrophobia and heart attacks
  - D. Arthritis and cancer
11. Fats, oils and waxes are compounds composed of many carbon, hydrogen and oxygen atoms. Animals and plants produce them. These compounds are also known as ...
- A. carbohydrates
  - B. proteins
  - C. lipids
  - D. nucleic acids
12. When testing for the presence of organic compounds in different substances, different indicator solution can be used. Benedict's solution turns from blue to yellow-orange-red indicating this organic compound is present.
- A. glucose
  - B. starch
  - C. fat/oil
  - D. protein
13. Active transport moves nutrients in an opposite direction to diffusion. To move nutrients from areas of low concentration to areas of high concentration requires ...
- A. special membranes
  - B. equal concentrations
  - C. energy
  - D. suction
14. Lichens are often the first organisms to colonize an area. They have been found in remote, isolated areas in Antarctica and high on mountains. Their substrate is ...
- A. snow
  - B. rock
  - C. water
  - D. dead animals



15. Although clarity seems to be a good indicator of water quality, there are some problems with this way of determining water quality. One reason is because ...
- A. Clear water can often taste bitter
  - B. Pure spring water contains growth hormones
  - C. Clear water can have harmful acid in it
  - D. If it can't be seen, it's not there

16. Calculate ppm ( You may use your calculator and do your rough work here )  
Food coloring was used for an experiment. 1998 ml of water was used with 8 drops ( 2ml ) of food coloring. What is the concentration of food coloring in **parts per million**?

$$2\text{ml per } 2000\text{ml of solution} = .001 \text{ parts per } 1000$$

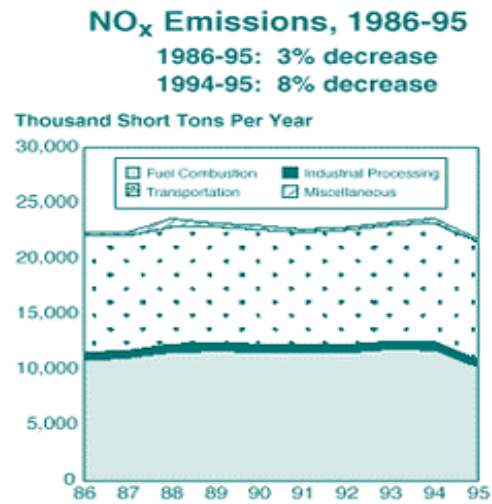
$$0.001 : 1000 = x : 1,000,000$$

$$\frac{0.001}{1000} = \frac{x}{1,000,000} \quad \frac{0.001}{1,000} \times 1,000,000 = \frac{x}{1,000,000} \times 1,000,000 = \mathbf{1 \text{ ppm}}$$

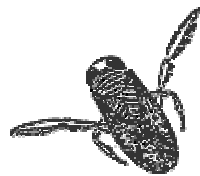
- A. 2 ppm
  - B. 2000 ppm
  - C. 1 ppm
  - D. 1000 ppm
17. Only certain chemicals are measured in parts per billion and parts per trillion. One of these chemicals is PCB (polychlorinated biphenyl). The reason that its level is constantly monitored in **parts per trillion** is because the chemical ...
- A. decomposes easily
  - B. reacts with organic compounds
  - C. magnifies up the food chain
  - D. magnifies down the food chain
18. A correct explanation of this statement – “The LD50 of DDT is 87mg/kg, for rats, by mouth.” is ...
- A. 50 rats will die if they eat 87 mg of DDT
  - B. 50% of the test population of rats will die if given 87 mg of DDT
  - C. 50 rats will die if they are given less than the 87mg/kg of DDT
  - D. 50% of the rat test population will survive if given 87mg/kg of body weight of DDT
19. It is a well-known fact that The Cat in the Hat was a bit of a Looney Tune. That would explain why his cleaning machine would never be approved for use in the real world because he ...
- A. used the wrong chemicals to clean up the mess
  - B. mixed chemicals, which caused a toxic hazard
  - C. didn't have the WHMIS symbols applied correctly
  - D. lost the MSDS information sheets for the chemicals he used
20. Calcium sulfate (gypsum) is recovered when sulfur dioxide reacts with calcium carbonate. Another product is also produced, which many think is contributing to the depletion of the ozone. This product is ...
- A. Hydrogen sulfide
  - B. Carbon dioxide
  - C. Chlorofluorocarbons
  - D. Nitrogen oxide



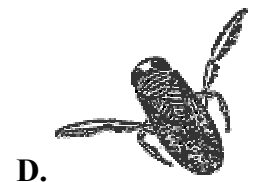
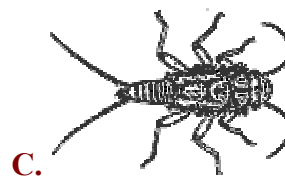
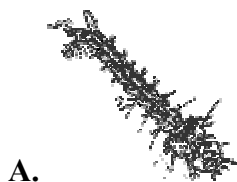
21. The Nitrogen oxide graph on the right identifies the total amount of emissions between 1986 and 1995.



- The decrease in NO<sub>x</sub> emissions in the graph between 1994 and 1995 indicates that there was a decrease of ...
- A. 5 % in transportation only
  - B. 5 % in all emissions
  - C. 8 % in all emissions
  - D. 11% in all emissions
22. From this list of pollutants,
- ozone   lead   particles   organic pollutants
- The chemical pollutant, which is a very small substance and light enough to be suspended in the air and water is ...
- A. ozone
  - B. particles
  - C. lead
  - D. organic pollutants
23. Certain aquatic invertebrates are called biological indicators because they are indicators of water quality.



- This biological indicator is a ...
- A. Midge larva
  - B. Stonefly nymph
  - C. Water boatman
  - D. Mosquito larva
24. Which of the following aquatic invertebrates is a stonefly nymph?





25. The Greenhouse Effect is a natural occurrence, keeping the temperature of the Earth constant. The gases in the atmosphere ...
- A. prevent energy from entering the atmosphere
  - B. trap energy in the upper atmosphere
  - C. reflect energy back into space
  - D. change energy into ozone
26. In 1998  $\text{SO}_{2(g)}$  emissions in Canada were measured at 2696 kt. The prescribed limit on these emissions was 3200 kt. The percentage that  $\text{SO}_{2(g)}$  was below the limit was ...
- A. 15.75 %
  - B. 84.25 %
  - C. 1.18 %
  - D. 98.82 %
27. Chlorofluorocarbons contribute to the thinning of the ozone layer in the upper atmosphere. The sun's radiation breaks them down into this chemical that destroys ozone by reacting with it to form oxygen.
- A. methane
  - B. sulfur
  - C. chlorine
  - D. hydrogen
28. Substances can be transported in air in three ways. The direction and distance these substances travel are determined by various factors. In Alberta airborne substances are carried eastward because of the ...
- A. Westerlies
  - B. Jet Stream
  - C. Rocky Mountains
  - D. Rotation of the Earth
29. Because of their location, people living in Calgary would be most concerned with environmental pollution coming from ...
- A. Medicine Hat Refinery
  - B. Fort McMurray Tar Sands
  - C. Trail B.C. Smelter
  - D. North Dakota Tire Plant
30. Examples of inorganic substances from de-icing roads, agricultural and home use, industrial products are ...
- A. iron calcium, selenium
  - B. heavy metals (lead and mercury)
  - C. bacteria, viruses, protozoans
  - D. salt, fertilizers acid rain
31. Tiny spaces in the soil between the soil grains are called ...
- A. pores
  - B. peats
  - C. permeables
  - D. impermeables
32. Some water can soak into the soil moving downward, dissolving harmful chemicals along the way and carrying them into the water table. This liquid is called ...
- A. pollutant
  - B. limestone
  - C. leachate
  - D. acid water



33. Some types of anaerobic bacteria remove chlorine from harmful chlorine-containing compounds like PCB's. The chlorine is removed from the pollutant's molecules and is replaced with ...
- A. oxygen
  - B. nitrogen
  - C. carbon
  - D. hydrogen
34. Chernobyl is a nuclear plant in Russia that had a meltdown. This put radiation into the atmosphere and into the soil. To remove the radiation from the groundwater at Chernobyl, these were used ...
- A. bacteria
  - B. plants
  - C. viruses
  - D. fungi
35. Photolysis is the breakdown of harmful compounds by sunlight. The formation of ozone is an example. Nitrogen dioxide is the pollutant. The formula that represents the photolysis process is ...
- A.  $\text{NO} \rightarrow \text{NO} + \text{O}_2 \rightarrow \text{O}_3 \rightarrow \text{O}_2 + \text{O}$
  - B.  $2\text{NO} \rightarrow \text{N} + \text{O}_2 \rightarrow \text{O}_3 + \text{N} \rightarrow \text{NO}$
  - C.  $\text{O} + \text{O}_2 \rightarrow \text{O}_3 \rightarrow \text{NO}_2 \rightarrow \text{NO} + \text{O}$
  - D.  $\text{NO}_2 \rightarrow \text{NO} + \text{O} \rightarrow \text{O} + \text{O}_2 \rightarrow \text{O}_3$
36. The bioaccumulation of harmful substances means the substance that is ingested or absorbed by an organism will increase in ...
- A. concentration
  - B. intensity
  - C. fatality
  - D. size
37. Spraying mosquito larvae, using an insecticide, is carefully monitored and controlled by the government. These spraying programs greatly reduce the numbers of mosquitoes that infect damage to livestock and people. A disease that is transmitted by mosquitoes is ...
- A. SPANISH FLU
  - B. SPINA BIFIDA
  - C. MAD COW DISEASE
  - D. WEST NILE VIRUS
38. The EXXON VALDEZ went aground in Prince William Sound on the southern coast of Alaska in 1989. The composition of the oil changed when it spilled from the tanker. The lightest and smallest molecules ...
- A. dispersed into the air and water
  - B. landed on shore as 'tar balls'
  - C. sank to the bottom as sediment
  - D. floated on the surface and were recovered
39. Of the 260,000 barrels of oil that spilled from the EXXON VALDEZ, the percentage that reached the shoreline was estimated to be ...
- A. 14%
  - B. 13%
  - C. 2%
  - D. 1%
40. WHMIS was set up by the federal government to provide information on hazardous materials used in the ...
- A. Science lab
  - B. Research lab
  - C. Workplace
  - D. Household



41.



This symbol means ...

- A. poisonous
- B. biohazardous**
- C. radioactive
- D. corrosive

42.



This symbol means ...

- A. flammable**
- B. oxydizing
- C. radioactive
- D. biohazardous

43. Anyone working with hazardous products must be familiar with WHMIS symbols and labeling. They must also be aware of information found on the MSDS information sheet that accompanies the product. The creation of the MSDS information sheet is the responsibility of the ...
- A. supplier**
  - B. employer
  - C. consumer
  - D. government
44. There are two times when the consumer will transport hazardous products for use in the home. In both cases care must be taken to protect the people in the transporting vehicle from fumes or spills. For this reason the harmful materials must be placed in ...
- A. plastic bags
  - B. wooden crates
  - C. recycled plastic bins
  - D. the car trunk or truck box**
45. Solid waste disposal has specific guidelines that should be followed to prevent contamination of the environment. If you have an empty can of paint, you should ...
- A. just throw it in the garbage**
  - B. take it to the waste collection site
  - C. take it to a waste treatment facility
  - D. place it in a sealed plastic bag and throw it in the garbage