Environmental Chemistry

Unit C - Section 1

Name Class

1. Materials which can harm living things and do not occur naturally in the environment are called ...
   A. Toxic
   B. Furons
   C. Phosphates
   D. Pollutants

2. The Bayer company, from Germany, produced Aspirin in 1898, from a synthetically produced chemical derived from ...
   A. Purple Cornflower
   B. Aspen Tree Bark
   C. Willow Tree Bark
   D. Echinacea Tea

3. Large quantities of carbon dioxide (130 million tonnes each year) are released into the atmosphere by these ...
   A. volcanoes
   B. earthquakes
   C. lightning strikes
   D. refrigeration trucks

4. Certain types of bacteria, located in the root nodules of specific types of plants, such as alfalfa, do most of this in the soil ...
   A. decompose
   B. scavange
   C. fix nitrogen
   D. eliminate pollutants

5. If soil lacks nitrogen, farmers can add fertilizer, or plant these ...
   A. nitrogen-producing chemicals
   B. nitrogen-fixing crops
   C. magnesium compounds
   D. soil enriched with bacteria

6. An organism that harms crops, people or structures is considered to be a ...
   A. insect
   B. parasite
   C. bacteria
   D. pest

7. 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. a life situation
   B. an issue
   C. an environmental action
   D. a viewpoint

8. To avoid waste chemicals dissolving or corroding some items in a sanitary landfill site, this is used ...
   A. gravel and bacteria
   B. gravel and compacted soil
   C. plastic liner and compacted clay
   D. biodegradable liner and pebbles

9. Fossils 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 ...
   A. $C_3H_8 + 5O_2 \rightarrow 3CO_2 + 4H_2O$ + energy
   B. $CO_2 + 2H_2O \rightarrow CH_4 + 2O_2$ + energy
   C. $CH_2 + H_2 \rightarrow CO_2 + O_2$ + energy
   D. $C_3H_8 + 4H_2O \rightarrow 3CO_2 + 5O_2$ + energy

10. Natural gas may contain hydrogen sulfide, a poisonous chemical. If natural gas does not contain hydrogen sulfide it is considered to be ...
    A. harmful
    B. corrosive
    C. sour
    D. sweet

11. Toothpaste has a pH of 10. Toothpaste is ...
    A. neutral
    B. a base
    C. a strong acid
    D. an acid base indicator

12. 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

13. Acidic lakes are treated with lime (calcium hydroxide) to neutralize them. The compound calcium sulfate is produced. Calcium sulfate is a ...
    A. acid
    B. base
    C. salt
    D. solution

14. 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

15. 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

16. 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

17. An organic compound that can have between 40 to 500 amino acids is called a ...
    A. lipid
    B. protein
    C. starch
    D. carbohydrate

18. 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 compounds is present.
    A. glucose
    B. starch
    C. fat/oil
    D. protein

19. 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

20. 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

Environmental Chemistry

Unit C - Section 2

Name Class

1. 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**

2. The type of indicator is used to determine the level of plant nutrients in a sample of water.
   - **A. biological organism**
   - **B. micro-biological organism**
   - **C. chemical indicator**
   - **D. invertebrates only**

3. **Calculate ppm** (You may use your calculator and do your rough work here)
   Food coloring was used for an experiment. 993ml of water was used with 16 drops (3ml) of food coloring. What is the concentration of food coloring in **parts per million**?

   - **A. 3 ppm**
   - **B. 3000 ppm**
   - **C. 16 ppm**
   - **D. 1600 ppm**

4. 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**

5. A freshwater biologist tested the level of dissolved oxygen in a section of the creek and found that it was quite low. The biologist was able to increase the level of dissolved oxygen by doing all of the following EXCEPT ...
   - **A. planting additional water plants**
   - **B. adding icewater**
   - **C. placing large boulders downstream**
   - **D. placing large boulders upstream**

6. An organism that harms crops, people or structures is considered to be a ...
   - **A. insect**
   - **B. parasite**
   - **C. bacteria**
   - **D. pest**

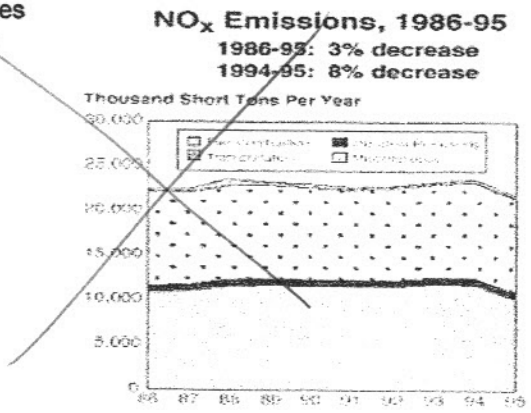
7. A correct explanation of this statement – "The LD50 of DDT is 87mg/kg, for rats, by mouth." is ...
   A. **50 rats will die if they eat 87 mg of DDT**
   B. **50% of the test population of rats will die if given 87 mg of DDT**
   C. **50 rats will die if they are given less than the 87mg/kg of DDT**
   D. **50% of the rat test population will survive if given 87mg/kg of body weight of DDT**

8. Acid shock is an environmental event that causes serious harm to these ...
   A. **bacteria and fungi**
   B. **eggs and young offspring**
   C. **very old organisms**
   D. **only mayflies and stoneflies**

9. It is now a well-known fact that mercury is a harmful heavy metal. Headbands on hats were treated in mercury before the harmful effects of mercury were known. This helps to explain the abnormal behavior of this character, from 'Alice In Wonderland' ...
   A. **The White Rabbit**
   B. **The Queen of Hearts**
   C. **The Calico Cat**
   D. **The Mad Hatter**

10. 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**

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



   The decrease in NO_x 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**

12. The pollutant which is also identified as the 'silent killer' is ...
   A. **ozone**
   B. **Carbon monoxide**
   C. **Carbon dioxide**
   D. **Sulfur dioxide**

13. From the list of pollutants provided,

nitrogen oxides sulfur dioxide carbon monoxide ozone lead particles organic pollutants

this one is a colorless, odorless gas composed of 3 oxygen atoms. At ground-level it forms from reactions between oxygen, nitrogen oxides and VOC's. The chemical pollutant is ...

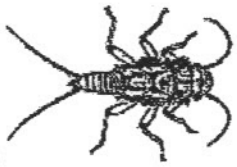
A. ozone
B. Carbon monoxide
C. Nitrogen oxides
D. Sulfur dioxide

14. Certain aquatic invertebrates are called biological indicators because they are indicators of water quality.

This biological indicator  is a ...

A. Midge larva
B. Stonefly larva
C. Water boatman
D. Mosquito larva

15. Which of the following aquatic invertebrates is a stonefly larva?

A. 
B. 
C. 
D. 

16. The amount of dissolved oxygen in the water supports different varieties of invertebrates. Which of the organisms in the question above would you likely find in water that has a dissolved oxygen level of 2?

A. Midge larva
B. Stonefly larva
C. Water boatman
D. Mosquito larva

17. 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

18. In 1998 $SO_{2(g)}$ emissions in Canada were measured at 2696 kt. The prescribed limit on these emissions was 3200 kt. The percentage that $SO_{2(g)}$ was below the limit was ...

A. 15.75 %
B. 84.25 %
C. 1.18 %
D. 98.82 %

19. 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

Environmental Chemistry

Unit C - Section 3

Name Class

1. 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. Rocky Mountains
   B. Westerlies
   C. Jet Stream
   D. Rotation of the Earth

2. 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

3. 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

4. Tiny spaces in the soil between the soil grains are called ...
   A. pores
   B. peats
   C. permeables
   D. impermeables

5. 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

6. The best way to keep the environment safe from potentially harmful substances is ...
   A. dispersion
   B. dilution
   C. prevention
   D. biodegradation

7. An environment where there is no oxygen is called ...
   A. anabolic
   B. aerobic
   C. anaerobic
   D. anabiotic

8. 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. hydrogen
   C. nitrogen
   D. carbon

9. 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. fungi
   C. viruses
   D. plants

10. 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. $NO_2 \rightarrow NO + O \rightarrow\rightarrow\rightarrow O + O_2 \rightarrow O_3$
   B. $2NO \rightarrow N + O_2 \rightarrow\rightarrow\rightarrow O_3 + N \rightarrow NO$
   C. $O + O_2 \rightarrow O_3 \rightarrow\rightarrow\rightarrow NO_2 \rightarrow NO + O$
   D. $NO \rightarrow NO + O_2 \rightarrow\rightarrow\rightarrow O_3 \rightarrow O_2 + O$

11. The bioaccumulation of harmful substances means the substance that is ingested or absorbed by an organism will increase in ...
   A. size
   B. intensity
   C. concentration
   D. fatality

12. 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. One of the diseases that is transmitted by mosquitoes is ...
   A. SARS
   B. WEST NILE VIRUS
   C. MAD COW DISEASE
   D. MUSCULAR DYSTROPHY

13. 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 lighter and smaller 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

14. 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%

15. 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

16.  This symbol means ...

A. poisonous
B. corrosive
C. dangerously reactive
D. toxic

17.  This symbol means ...

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

18.  This symbol means ...

A. poisonous
B. corrosive
C. compressed gas
D. biohazardous

19.  This symbol means ...

A. biohazardous
B. oxydizing
C. explosive
D. toxic

20. 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. consumer
    B. employer
    C. supplier
    D. government

21. 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. the car trunk or truck box
    D. recycled plastic bins

22. Solid waste disposal has specific guidelines that should be followed to prevent contamination of the environment. If you have a can of hair spray that is not quite empty, you should ...
    A. place it in a sealed plastic bag and throw it in the garbage
    B. take it to a waste treatment facility
    C. take it to the waste collection site
    D. empty the contents and throw it in the garbage