

UNIVERSITY OF SWAZILAND

Faculty of Health Sciences

(BSC) IN ENVIRONMENTAL HEALTH

SECOND SEMESTER FINAL EXAMINATION PAPER 2011

TITLE OF PAPER : ENVIRONMENTAL CHEMISTRY II

COURSE CODE : EHS 414

DURATION : TWO HOURS

MARKS : 100

INSTRUCTIONS :

- : ANSWER ONLY FOUR QUESTIONS
- : EACH QUESTION CARRIES 25 MARKS
- : QUESTIONS ONE AND TWO ARE COMPULSARY
- : NO QUESTION PAPER SHOULD BE BROUGHT INTO NOR OUT OF THE EXAMINATION ROOM
- : BEGIN EACH QUESTION ON A SEPARATE SHEET OF PAPER

DO NOT OPEN THIS QUESTION PAPER UNTIL PERMISSION IS GRANTED BY THE INVIGILATOR

SECTION B

QUESTION ONE (COMPULSORY)

1. Atmospheric particles formed from gases are called
 - a. Condensation aerosols
 - b. Solid particulate matter
 - c. Hydroxyl radical
 - d. Non ionic aerosols

2. A person with kidney damage after an acute exposure to a toxic metal is showing
 - a. A chronic effect
 - b. A subchronic effect
 - c. An acute effect
 - d. A subacute effect

3. Teratogenic chemical substances
 - a. Are fatal to humans in low doses
 - b. Cause mutations
 - c. Are harmful because they are irritating to skin or lungs
 - d. Cause mutations

4. Of the following chemicals, the least likely to cause birth defects is
 - a. Polychlorinated biphenyls
 - b. Mercury
 - c. Iodized Sodium chloride
 - d. Polybrominated biphenyls

5. In adults, exposure to lead can affect the
 - a. Peripheral nerves
 - b. The central nerves
 - c. The nose
 - d. The alimentary canal

6. You have been studying a large dam ecosystem at Siphofaneni. You learn that PCBs have been dumped into the water. You predict that the most affected population would be the
 - a. Algae
 - b. Small fish
 - c. Predatory birds
 - d. Zooplankton

7. Particulate matter in the atmosphere resulting from burning of coal include all of the following except
 - a. Carbon monoxide
 - b. Sulfur dioxide
 - c. Soot
 - d. Ozone
8. Gray-air smog comes from suspended particles of
 - a. Carbon dioxide
 - b. Ammonium salts
 - c. Soot
 - d. Carbon sulfide
9. Acid deposition is best classified as the ----- deposition of ----- pollutants onto Earth's surface
 - a. Wet ... secondary
 - b. Dry ... secondary
 - c. Wet and dry ... primary
 - d. Wet and dry ... secondary
10. Sources of carbon monoxide include all of the following except
 - a. Cigarette smoking
 - b. Anaerobic respiration
 - c. Motor vehicles
 - d. Faulty heating systems
11. carbon monoxide
 - a. causes the blood to carry too much oxygen
 - b. speed up reflexes
 - c. causes headaches and dizziness
 - d. sharpens thinking and perceptions
12. Which of the following is a characteristic of chlorofluorocarbons?
 - a. Nontoxic
 - b. Corrosive
 - c. Odorous
 - d. Flammable
13. Chlorofluorocarbons are used in all of the following except
 - a. Air conditioners
 - b. Aerosol spray cans
 - c. Sterilants for hospital equipment
 - d. Fire extinguishers

14. Chlorofluorocarbons are released into the atmosphere by all of the following except
- Spray cans
 - Discarded refrigerators
 - Burning of artificial logs in fireplaces
 - Leaking of air conditioners
15. The frequency and severity of smog in an area depends least upon the
- Local climate and topography
 - Fuels used in industry, heating, and transportation
 - Size of the ozone hole over the arctic
 - Density of the population
16. All of the following describe soils that are vulnerable to acid deposition except soils that are
- Thin
 - Low in buffering ions
 - High in hydroxyl (OH^-) ions
 - Acidic
17. Of the following strategies to reduce acid deposition, the least effective is probably
- Removing sulfur from coal before it is burned
 - Reducing energy use
 - Switching to natural gas
 - Adding lime to neutralize the acids
18. Furniture stuffing, paneling, particle board, and foam insulation may be sources of
- Chloroform
 - Mercury
 - Carbon monoxide
 - Asbestos
19. Respiratory illnesses in developing countries are most likely to be caused by
- Mercury
 - Cigarettes smoke
 - Particulate matter
 - Asbestos
20. Pipe insulation and vinyl ceiling and floor tiles may be sources of
- Chloroform
 - Formaldehyde
 - Carbon monoxide
 - Asbestos

21. There is now general agreement that the best way to treat undamaged asbestos in buildings is to
- Remove it immediately
 - Treat it with chemicals that will dissolve it
 - Burn it
 - Seal or wrap it to prevent release of fibers
22. Pollutants that can penetrate the lungs' natural defenses include
- large suspended particles
 - fine and ultrafine suspended particles
 - ozone
 - acid rain
23. Acid shock that may damage aquatic life in a coal mining area such as Maloma is the result of the sudden runoff of acid water with dissolved
- Lead
 - Chromium
 - Fluorine
 - Aluminium
24. Human health problems closely associated with exposure to asbestos include all of the following except
- Pulmonary pleural asbestosis
 - Mesothelioma
 - Lung cancer
 - paresthesia
25. Human health problems closely associated with exposure to lead include all of the following system disorders except
- Neurological
 - Mesothelioma
 - Hematological
 - Renal

TOTAL 25 MARKS

QUESTION TWO (COMPULSORY)

Describe smog under the following themes

- Formation (5 marks)
- Its effects (5 marks)
- Ways of reducing (5 marks)
- Health and environmental impacts (10 marks)

TOTAL 25 MARKS

SECTION B

Answer any two questions

QUESTION THREE

Mercury could be characterized as one of the most widely used toxic heavy metallic substance. It may be found in combination with other elements or in elemental form in the environment.

- Describe the toxic effects methylmercury on human health(8 marks);
- Explain how one can get exposed to mercury (5 marks); and
- As a prospective health worker, propose how you could help protect a given community from lead poisoning (8 marks).
- List four products where mercury is used (4 marks)

TOTAL 25 MARKS

QUESTION FOUR

Draw the structural formulae of the following anthropogenic environmental pollutants and elaborate on the uses of each and name two health effects of each.

- The Freon *dichlorodifluoromethane* (5 marks);
- The epoxide *propylene oxide* (5 marks);
- The organonitrogen compound *acrylonitrile* (5 marks);
- 2,6-dimethylnaphthalene (5 marks); and
- Methylethyl ketone (5 marks)

TOTAL 25 MARKS

QUESTION FIVE

Describe compact detergents under the following themes

- Ingredients and indicating what has been removed from them as compared to the conventional detergents (8 marks)
- Advantages over the conventional detergents (10 marks)
- Environmental impacts (7 marks)

TOTAL 25 MARKS