

UNIVERSITY OF SWAZILAND

Faculty of Health Sciences

(BSC) IN ENVIRONMENTAL HEALTH

SECOND SEMESTER FINAL EXAMINATION PAPER 2008

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

QUESTION ONE

1. All of the following are volatile organic compounds (VOCs) except
 - (a) methane
 - (b) chlorofluorocarbon
 - (c) carbon monoxide
 - (d) benzene
2. All of the following are photochemical oxidants except
 - (a) dioxin
 - (b) hydrogen peroxide
 - (c) peroxyacyl nitrates (PANs)
 - (d) benzene
3. Photochemical smog generally requires the presence of
 - (a) nitrogen oxides
 - (b) sunlight
 - (c) volatile organic compounds
 - (d) all of the above.
4. All of the following describe soils that are vulnerable to acid deposition except
 - (a) thin
 - (b) low in buffering ions
 - (c) high in hydroxyl (OH^-) ions
 - (d) acidic.
5. Asbestos has been used for the following except
 - (a) fire proofing
 - (b) insulation of refrigerators
 - (c) insulation of heaters and pipes
 - (d) wall and ceiling decoration
6. The major greenhouse gases include all of the following except
 - (a) chlorofluorocarbons (CFCs)
 - (b) carbon dioxide and water vapour
 - (c) sulphur dioxide
 - (d) ozone and nitrous oxide.
7. Increased greenhouse gases originate from
 - (a) burning fossil fuels
 - (b) use of CFCs
 - (c) deforestation
 - (d) all of these answers.
8. The threat to global warming can be addressed by
 - (a) using energy more efficiently
 - (b) halting deforestation
 - (c) slowing population growth
 - (d) all of the above

9. Which of the following would be used to kill weeds
- (a) herbicides
 - (b) rodenticides
 - (c) fungicides
 - (d) insecticides
10. Broad-spectrum pesticides may increase the number of pest species through
- (a) development of genetic resistance
 - (b) killing of predators of the pest species
 - (c) killing of parasites that may have kept the population of pest low.
 - (d) All of the above
11. The pesticide treadmill involves
- (a) use of stronger doses of pesticide
 - (b) a switch to new chemicals
 - (c) use of more frequent doses of pesticide
 - (d) all of the above.
12. Which of the following statements about the potential effects of global warming on human health is false?
- (a) Food and freshwater supplies are likely to be disrupted
 - (b) People are likely to be displaced
 - (c) Insect-borne diseases are likely to decrease in today's temperate zones
 - (d) Sanitation systems in coastal cities may be flooded
13. Chlorofluorocarbons are
- (a) Nontoxic
 - (b) Corrosive
 - (c) Odorous
 - (d) Flammable
14. The ozone layer is most effective in blocking
- (a) UV-C, the highest-energy UV band
 - (b) UV-B, the middle-energy UV band
 - (c) UV-A, the lowest-energy UV band
 - (d) CFCs
15. A single chlorine atom contained in CFCs can convert as many as ----- ozone molecules to molecular oxygen molecules
- (a) 100
 - (b) 1,000
 - (c) 10,000
 - (d) 100,000

16. Chemicals capable of destroying the ozone include all of the following except
- (a) Chlorofluorocarbons
 - (b) Formaldehyde uses as a preservative
 - (c) Halons in fire extinguishers and crop fumigants
 - (d) Carbon tetrachloride used in a solvent
17. In 1987, 36 nations meeting in Montreal, Canada, developed the Montreal Protocol to reduce production of
- (a) Carbon dioxide
 - (b) Nitrous oxide
 - (c) CFCs
 - (d) Toxic wastes
18. Pyrethrum is a pesticide derived from
- (a) Red pepper
 - (b) Tomatoes
 - (c) Marigolds
 - (d) Chrysanthemums
19. Which of the following is more likely to become biologically magnified in a food chain
- (a) DDT
 - (b) Parathion
 - (c) Carbaryl
 - (d) Malathion
20. Farm workers in Swaziland are especially vulnerable to pesticide poisoning for all of the following except
- (a) Few warnings
 - (b) Little use of protective equipment
 - (c) A gene pool particularly susceptible to pesticides
 - (d) Predominantly hand-application of pesticides
21. Biocides include
- (a) DDT
 - (b) *Bacillus thuringensis*
 - (c) Carbamates
 - (d) Organophosphates
22. The two predominant greenhouse gases in the troposphere are
- (a) Carbon dioxide and ozone
 - (b) Carbon dioxide and water vapor
 - (c) Nitrogen and water vapor
 - (d) Nitrous oxide and sulfur

23. Pipe installation and vinyl ceiling and floor tiles may be sources of
- (a) Chloroform
 - (b) Formaldehyde
 - (c) Carbon monoxide
 - (d) Asbestos
24. Sick building syndrome is linked to all of the following except
- (a) Headaches
 - (b) Coughing and sneezing
 - (c) Lung cancer
 - (d) Chronic fatigue
25. Furniture stuffing, paneling, particle board, and foam insulation may be sources of
- (a) Chloroform
 - (b) Formaldehyde
 - (c) Carbon monoxide
 - (d) Asbestos

Total 25 Marks

QUESTION TWO

- (a) Mention any five sources of sulphur compounds that enter the atmosphere (5 marks).
- (b) With the aid of balanced chemical equations, describe the chemical transformations of sulphur compounds in the environment (10 marks)
- (b) Discuss any five effects of sulphur dioxide on the environment (10 marks)

Total 25 Marks

QUESTION THREE

Name five types of pesticides and indicate what each is used to for (10 marks).

- (a) Explain the consequences of relying heavily on pesticides (5 marks)
- (b) Discuss pesticide treadmill (5 marks).
- (c) Describe the threat of pesticides to the health of wildlife (5 marks).

Total 25 Marks

QUESTION FOUR

Draw and describe the origin and structure of the following compounds.

- (a) Methane (3 marks)
- (b) ethylene (3 marks)
- (c) xylene (4 marks)
- (d) benzene (4 marks)
- (e) acetylene (5 marks)
- (f) naphthalene (6 marks)

Total 25 Marks

QUESTION FIVE

Draw the structure of the following halogenated aromatic compounds and list three health effects of each.

- (i) polychlorinated biphenyl (6 marks)
- (ii) poly chlorinated dibenzo-p-dioxin (TCDD) (7 marks)
- (iii) DDT (6 marks)
- (iv) Polybrominated biphenyl (6 marks)

Total 25 Marks.

GOOD LUCK!!!!!!!!!!!!