

IN CLASS EXAM

ENVH 111: Exploring Environment and Health Connections
November 9, 2010

This exam has 100 possible points. Each question is worth two points unless otherwise indicated. For multiple choice and true/false, circle the correct answer.

1. Environmental Health is primarily about how the
 - a. health of the environment is impacted by pollution
 - b. health of the climate is impacted by carbon dioxide
 - c. health of humans is impacted by the environment**
 - d. health of animals is impacted by environment
 - e. environment is impacted by humans

2. Public Health is primarily
 - a. management of health care and prescription drugs programs
 - b. protection and promotion of health on a population level**
 - c. how society provides welfare to the poor
 - d. single payer health insurance
 - e. Medicaid and Medicare

3. Name four of the ten Great Public Health achievements in the 20th century report by the Centers for Disease Control and Prevention [4 pts]
Vaccinations, motor vehicle safety, safer workplaces, control of infectious diseases, heart disease and stroke awareness, safer and healthier foods, healthier mothers and babies, family planning, fluoridation of drinking water, tobacco use

4. In which of the following organisms would you most likely find the greatest amount of organic mercury?
 - a. Algae
 - b. Small aquatic invertebrates
 - c. Small, bottom feeding fish
 - d. Large sport fish**
 - e. All should have about the same amount of organic mercury

5. What do the initials "IPCC" stand for?

Intergovernmental Panel on Climate Change

6. What type of radiation do "greenhouse gases" absorb?

- a. Sunlight
- b. Microwaves
- c. Infrared**
- d. Ultra-violet
- e. Cosmic

7. Why is carbon dioxide critical for ecosystem health?

Carbon dioxide is needed for plant respiration.

8. "Keeling's Curve" refers to the measurement of change in

- a. ocean acidification
- b. global temperatures
- c. costs associated with controlling greenhouse gases
- d. atmospheric carbon dioxide**
- e. ice melting in Greenland

9. What continent is projected to have the greatest mortality in the 21st century due to climate change?

- a. Asia
- b. Africa**
- c. Europe
- d. South America
- e. North America

10. In the NIH report "Climate Change and Human Health" the authors discuss climate change *mitigation* and climate change *adaptation*. Explain the difference. [4 pts]

Mitigation: actions taken to reduce greenhouse gas emissions, enhancement of sinks that trap or remove carbon from the atmosphere.

Adaptation: Actions taken to lessen the impact on health and the environment.

11. Climate models through 2080 for the Pacific Northwest project a significant increase in

a. _____ on

_____ ature

_____ cloud cover

d. wind speed

e. none of the above

The United States Department of Agriculture (USDA) did not define organic standards until _____ though a number of foods advertised as "organic" were on the market. In 2-3 sentences describe USDA's current interpretation of "organic".

Produce and other ingredients are grown without the use of pesticides, synthetic fertilizers, sewage sludge, genetically modified organisms, or ionizing radiation. Animals that produce meat, poultry, eggs, and dairy products do not take antibiotics or growth hormones.

13. Give one reason why it took so long (12 years) to settle on a common definition of organic. **Large agro-industry was not organized to function from organic production and it was not necessarily in their best business interests. It was hard to define due to rapidly advancing bio-technology. People are often confused about the definitions of "natural" vs. "organic". Spray drift, some pesticides get onto organic foods, so it is difficult to be 100% pesticide-free.**

14. Pesticide “pray drift” may result in:
- a. increased crop production
 - b. injury to non-target plants
 - c. possible human exposures
 - d. algae blooms
 - e. a & b only
 - f. **b & c only**

15. Name one genetically modified agricultural plant and explain the advantage that the modification provides in terms of agricultural production. [4 pts]

Corn—Bt resistant to some pests, larger, sweeter, looks nicer, high yields.

Soybean—resistant to some herbicides, high yields, larger

Golden rice—larger, high yields, has nutritional value, vit A (beta carotene)

(Other examples that were correct or described in detail)

16. Name the two federal agencies with primary responsibility for food safety.
- FDA Food and Drug Administration,**
USDA US Department of Agriculture

17. Explain the difference between “food safety” and “food security”. [4 pts]

Food Safety: Protection from foodborne illnesses, which are diseases usually either infectious or toxic in nature, caused by agents that enter the body through the ingestion of food.

Food Security: The ready availability of nutritionally adequate and safe foods, and an assured ability to acquire acceptable foods in socially acceptable ways (without resorting to emergency food supplies, scavenging, stealing, or other coping strategies).

18. An environmental disaster occurred in Bhopal, India in December 1984. What was the toxic chemical that was released?

- a. carbaryl
- b. phosgene
- c. **methyl isocyanate**
- d. DDT
- e. 1-nathol

19. Name two equipment operation or safety failures that contributed to the toxic chemical release. [4 pts]

- MIC refrigeration unit inoperable for 5 months
- MIC was already at 15-20oC instead of 0oC
- Water mixed with MIC during cleaning
- Violent exothermic reaction produced gas
- No temperature alarm sounded; alarm not reset
- Pressure indicator ignored; known to fail
- Vent gas scrubber not operating; had been on
- Stand-by since October 23
- Flare tower to burn gas out of service

20. Which of the following was the primary acute health effect for Bhopal residents?

- a. liver disease
- b. cancer
- c. eczema (allergic reaction of the skin)
- d. respiratory problems**
- e. hormonal disruption

21. The toxic chemical release killed thousands in a single night. How does this situation reflect the common plight of slum dwellers in developing countries?

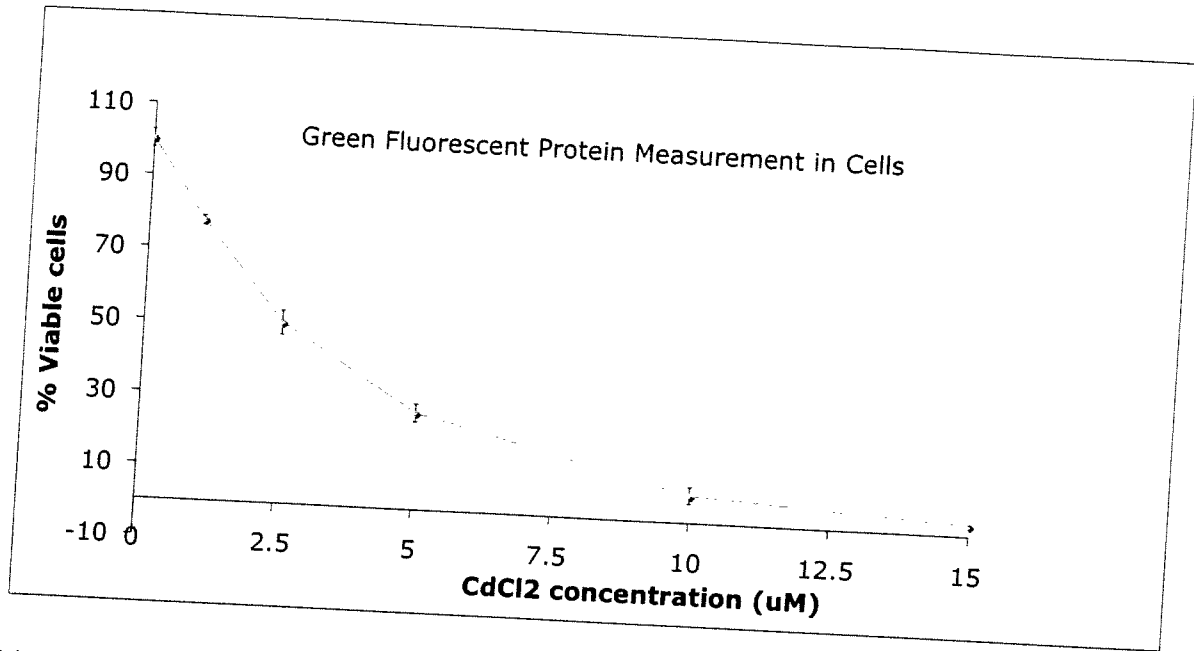
- a. The chemical plant containing a potentially dangerous chemical process was in very close proximity to powerless slum dwellers.**
- b. The dilapidated housing of the slum dwellers trapped the gases and worsened the poisoning.
- c. The huge number of animals in the slum caused residents to be crushed by stampeding herds.
- d. The sewer plan in the community was inadequate to accommodate the toxic outflow and it stagnated and formed the poisonous gas.
- e. Clean water was unavailable to residents and so washing facilities were unavailable to protect those exposed.

22. Name two major uses of lead in commercial products that contributed to elevated lead exposures in children during the 20th century.

Lead in toys, paint, gasoline, solder (cans), and piping (plumbing)

23. According to the Institute of Medicine report on the BP oil spill in the Gulf of Mexico, which of the following exposures among cleanup workers are of concern?

- a. bird flu
- b. volatile organic compounds
- c. chemical dispersants
- d. a & c
- e. b & c**
- f. a, b & c



24. Based on the above graph, identify the concentration of cadmium chloride (CdCl_2) associated with percent of viable cells for each of the following:

NOEL: _____ [2 pts]

LOEL: _____ [2 pts]

LC-50: _____ [2 pts]

LC-90: _____ [2 pts]

NOEL = 0; LOEL = about 1; LC-50 = 2.5; LC-90 = 10

25. Percival Pott was a surgeon in London in the 19th century. He determined that chimney sweeps developed a specific disease due to a specific exposure. What type of exposure agent were the chimney sweeps exposed to?

- radioactivity
- an organophosphorus pesticide
- an endocrine disrupting compound
- an environmental carcinogen**
- a toxic metal

26. The REACH program
- is a recently-adopted policy in the United States
 - places the burden of proof of hazard on regulatory agencies
 - requires manufacturers to full evaluate the safety of their products**
 - has different requirements for new and "existing" chemicals
27. *In vitro* toxicity testing involves
- dosing of cultured cells**
 - dosing of laboratory animals
 - both a & b
 - none of the above
28. It is not a good idea to take acetaminophin (Tylenol™) after drinking alcohol, since the combination will cause
- severe nausea
 - damage to the liver**
 - an even more painful headache
 - hallucinations
 - symptoms of Parkinson's Disease
29. Cancer is considered to be which of the following three-stage processes:
- initiation, replication, progression
 - initiation, progression, reversion
 - initiation, promotion, progression**
 - initiation, apoptosis, progression
 - initiation, promotion, apoptosis
30. DDT (dichlorodiphenyltrichloroethane)
- is used to control mosquito populations
 - was banned in the US in the 1970s
 - causes skin irritation
 - all of the above
 - a & b only**

NAME _____ STUDENT ID# _____

31. Explain the basic difference between two mechanisms of cell death: *necrosis* and *apoptosis*.
[4 pts]

Necrosis: The process of cell death where energy supply does not meet demand, resulting in loss of cellular homeostasis, membrane burst and uncontrolled cell death. Somewhat of a "catch-all" term.

Apoptosis: The process in which a cell regulates cell death by actively killing itself, stimulated to do so by specific signals

32. Recently a caustic sludge (red sludge) flooded several Hungarian towns. What was the most serious immediate health effect of the red sludge on people living in the towns?

- a. Contamination of sewer and water systems
- b. Exposure to air pollutants generated by the sludge
- c. Heavy metal contamination of homes
- d. Skin burns**
- e. Lead poisoning in children

33. What industrial process produced the red sludge?

- a. Coal mining
- b. Aluminum manufacturing**
- c. Sewage composting
- d. Agricultural runoff
- e. Steel manufacturing

34. Since the creation of OSHA in 1970, the death rate from workplace injuries and illnesses has risen sharply in the United States.

- a. True
- b. False**

35. Worker compensation can be best described as which of the following:
- a. a program to replace lost wages when a worker gets sick outside of work
 - b. a program designed to provide hazardous duty pay for certain jobs
 - c. **an insurance program designed to provide healthcare and lost wages to workers injured or made ill on the job**
 - d. a training program designed to expand the job skills of poorly educated workers
 - e. a healthcare program intended to enhance the physical well being of undercompensated workers.
36. According to Dr. Van Hee, the most critical part of making a diagnosis of an occupational disease is to
- a. **take an occupational history**
 - b. take measurements in the workplace
 - c. file a worker compensation form
 - d. focus on a single organ system
 - e. conduct testing on the patient's lungs
37. Unions negotiate with employers on the behalf of the union members. Some of the things unions and employers negotiate include
- a. workplace health and safety
 - b. wages and benefits
 - c. enforcement of federal regulations
 - d. **a & b**
 - e. a & c
38. According to the Director of OSHA, David Michaels, the ability of OSHA to impose fines for health and safety violations is
- a. Too strong
 - b. **Not strong enough**
 - c. About right
 - d. Not necessary
39. In the 1990s Dr. David Kern, an OEM physician at Brown University, discovered a new disease associated with the manufacturing of materials for car upholstery. What name was given to this disease?
- a. Wrist-drop syndrome
 - b. Block worker's palsy
 - c. **Flock worker's lung**
 - d. Chloracne
 - e. Nylon-induced necrosis

NAME _____ STUDENT ID# _____

40. Prevention is an important goal in occupational and environmental medicine. Dr. Van Hee talked about three types of prevention: primary, secondary and tertiary. Explain the difference between *primary* and *tertiary* prevention. [4 pts]

Primary prevention: Activities designed to prevent disease *before* it occurs

Tertiary prevention: Preventing complications of disease, slowing its course, treating it, *after* disease is noticed by the patient

That's all, folks!

