UNIVERSITY OF SWAZILAND

Faculty of Health Sciences

(BSC) IN ENVIRONMENTAL HEALTH

FIRST SEMESTER FINAL EXAMINATION PAPER 2008

TITLE OF PAPER	:	ENVIRONMENTAL ECOLOGY1
COURSE CODE	:	EHS 555
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. Natural capital includes all of the following except
    a. Sunlight.
    b. Air.
    c. Water.
    d. Soil.

2. Most of the environmental problems we face are
    a. Increasing linearly.
    b. Decreasing linearly.
    c. Increasing exponentially.
    d. Decreasing exponentially.

3. Sustainable development can be distinguished from economic development by its emphasis on
    a. Meeting the needs of people
    b. Intergenerational equity.
    c. Use of economic systems and earth's resources.
    d. Setting limits on human population growth.

4. Which of the following best describes the concept of environmental degradation?
    a. Using solar power at aid rate.
    b. Using oil.
    c. Cutting trees for wood products.
    d. Letting agricultural runoff cause oxygen depletion and fish kills downstream.

5. On the outskirts of the Municipality of Manzini lies a forest on Swazi Nation Land. When Violet Mwendera is applying the precautionary principle, she might suggest
    a. Clear-cutting the forest to provide taxes for the town.
    b. Converting the natural woods to tree farms.
    c. Harvesting trees at their estimated sustainable yield.
    d. Harvesting trees below their estimated sustained yield.

6. New efforts to prevent the tragedy of the commons include
    a. Using common-property resources at or above their sustained yields.
    b. Converting land from private to more public ownership.
    c. Moving from a taxpayers pay approach to a users pay approach.
    d. Moving from a users pay approach to a taxpayers pay approach.

7. Root causes of environmental problems include
    a. Rapid population growth.
    b. Even distribution of wealth.
    c. Increasing sustainable use of resources.
    d. Prices reflecting environmental costs.

8. Which of the following would be representative of an environmental wisdom worldview?
    a. Continuous rapid economic growth will improve environmental conditions.
    b. Energy and materials efficiency must continually be improved.
    c. More money should be directed to research on controlling the environment.
    d. Human beings are the most important life forms on earth.

9. The service least likely to be performed by the insect family is
    a. Plant reproduction.
    b. Plant pollination.
    c. Turning the soil.
    d. Chemosynthesis.

10. The following choices list levels of organization of matter that claim the attention of ecologists. Which correctly lists these levels in sequence from narrower to broader focus?
    a. Organisms – populations – communities – ecosystems – ecosphere.
    b. Organisms – communities – populations – ecosystems – ecosphere.
    c. Organisms – populations – communities – ecosphere – ecosystems.
    d. Ecosphere – ecosystems – communities – populations – organisms.

11. A group of individuals of the same species occupying a given area at the same time is called a
    a. Family.
    b. Population.
    c. Community.
    d. Genus.

12. a community of living organisms interacting with one another and the physical and chemical factors of their nonliving environment is called
    a. A species.
    b. An ecosystem.
    c. A population.
    d. A lithosphere.

13. Ecosphere is the same as
    a. Atmosphere.
    b. Lithosphere.
    c. Biosphere.
    d. Hydrosphere.

14. Life of individual organisms is maintained by
    a. Cycling of energy and flow of matter.
    b. Flow of energy and cycling of matter.
    c. Cycling of energy and matter.
    d. Flow of energy and matter.

15. The most important factor in determining which biome is found in a particular area is
    a. Soil type.
    b. Topography.
    c. Nutrient availability.
    d. Climate.

16. Aquatic life zones are the aquatic equivalent of
    a. Communities.
    b. Ecosystems.
    c. Populations.
    d. Biomes.

17. You are a scientist intrigued by organisms that can create complex molecules through chemosynthesis. The habitat you are likely to visit is
    a. An island paradise.
    b. An inland sand dune.
    c. A hydrothermal vent.
    d. A grass land.

18. Vultures, hyenas, and flies are all examples of
    a. Detritivores.
    b. Herbivores.
    c. Autotrophs.
    d. Scavengers.

19. The pyramid which best explains why there are typically only four to five links in a food chain is the pyramid of
    a. Energy.
    b. Biomass.
    c. Numbers.
    d. Matter.

20. The phosphorus cycle is an example of a(n)
    a. Hydrologic cycle.
    b. Sedimentary cycle.
    c. Carbohydrate cycle.
    d. Atmospheric cycle.

21. Transfer of carbon between organisms depends primarily on
    a. Fuel combustion and decomposition.
    b. Photosynthesis and cellular respiration.
    c. Soil bacteria and precipitation.
    d. Volcanic activity and organic decay.

22. The gas that is least likely to have formed Earth's primitive atmosphere is
    a. Methane.
    b. Ammonia.
    c. Oxygen.
    d. Water vapor.

23. A change in the genetic composition of a population over successive generations is called
    a. Emigration.
    b. Mutation.
    c. Natural selection.
    d. Evolution.

24. The change in coloration within the population of peppered moths is an example of
    a. Coevolution.
    b. Microevolution.
    c. Convergent evolution.
    d. Macroevolution.

25. An ecological niche includes all of the following except
    a. The nutrient relationships with other species.
    b. The location where a species lives.
    c. The type of resource requirements.
    d. The range of tolerance to different physical and chemical conditions.

TOTAL 25 MARKS

QUESTION TWO

What would happen to an ecosystem if

a. All its decomposers and scavengers were eliminated? (6 marks)
b. All its producers were eliminated? (6 marks)
c. All of its insects were eliminated? (6 marks)
d. Could a balanced ecosystem exist with only producers and decomposers and no consumers such as human beings and other animals? (1 mark)
e. Explain your answer to (d) above. (6 marks)

TOTAL 25 MARKS

QUESTION THREE

1. The human beings have thrived on this planet as a species mostly because of our strong opposable thumbs, ability to walk upright and complex brains. Discuss this statement by first considering the traits we do not have, and then the strengths listed above. (10 marks)
2. How would you respond to someone who says that because extinction is a natural process, we should not worry about the loss of biodiversity? (5 marks)
3. Describe the major differences between the ecological niches of humans and cockroaches. (6 marks)
4. Are these two species in (3) above in competition? 2 marks)
5. If so how do these species in (3) above manage to coexist? (2 marks)

TOTAL 25 MARKS

QUESTION FOUR

1. Explain why deserts and arctic tundra support a much smaller biomass of animals than do tropical forests. (9 marks)
2. Discuss why most species living at high latitudes and high altitudes tend to be ecological generalists while those living in the tropics tend to be ecological specialists. (8 marks)

3. Describe how would our lifestyles be affected if all of the world's coral reefs disappeared (8 marks)

TOTAL 25 MARKS

QUESTION FIVE

1. Describe how natural selection can affect predator-prey relationships and how predator-prey relationship can affect natural selection. (10 marks)

2. Use the second law of thermodynamics to help explain why predators are generally less abundant than their prey. (6 marks)

3. Inland wetlands act like natural sponges that absorb and store excess water from storms and provide a variety of wildlife habitats. Defend this statement. (9 marks)

TOTAL 25 MARKS

GOOD LUCK!!!!!!!

ADDITIONAL USEFUL MATERIALS

$Q = It$
$V = IR$
$R_T = R_1 + R_2 + R_3$
$E/I = R + r$
$r = (E-V)/I$
$V_T = V_1 + V_2 + V_3$
$I_T = I_1 + I_2 + I_3$
$R = (R_1R_2)/ (R_1 + R_2)$
$R = pL/A$
$W = QV$
$QV/t = IV$
$P = W/t$
$P = IV$
$P = I(IR)$
$P= I^2R$
$P = V^2/R$
$W = I^2Rt$
$W = V^2t/R$
$W = VIt$
$W = Pt$
$W = V(Vt)/R$
$W= V^2t/R$
$W = F \times s$
$F \cos\theta \times s$
$F= Fs \cos\theta$