

# UNIVERSITY OF SWAZILAND

Faculty of Health Sciences

(BSC) IN ENVIRONMENTAL HEALTH

FIRST SEMESTER FINAL EXAMINATION PAPER 2007

TITLE OF PAPER: **ENVIRONMENTAL ECOLOGY 1**

COURSE CODE : EHS 555

DURATION : **TWO HOURS**

MARKS : 100

INSTRUCTIONS : **ANSWER ONLY FOUR QUESTIONS.**

: **EACH QUESTION CARRY 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.

197

## QUESTION ONE

1. Most of the environmental problems we face are
  - a. increasing linearly
  - b. decreasing linearly
  - c. increasing exponentially
  - d. decreasing exponentially
  
2. If the Swaziland's population grew by 2% in 1998 and continued at the same rate, how long would it take to double?
  - a. 20 years
  - b. 25 years
  - c. 30 years
  - d. 35 years
  
3. What is globalization?
  - a. ability to travel worldwide
  - b. new term for mass immigration
  - c. world-wide integration of social, economic, and environmental change
  - d. a satellite communications system
  
4. The deer grazed watchfully in the meadow. She slowly moved toward the stream for a drink. As the sunset deepened, she bedded down, hiding from predators among the overhanging branches of trees and shrubs. The deer was using
  - a. both ecological and economic resources
  - b. ecological but not economic resources
  - c. economic but not ecological resources
  - d. neither economic nor ecological resources
  
5. The service least likely to be performed by the insect family is
  - a. plant reproduction
  - b. plant pollination
  - c. turning the soil
  - d. chemosynthesis
  
6. 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

7. Biodiversity emerges from
  - a. mutation
  - b. natural selection
  - c. extinction
  - d. all of these answers
  
8. Ecosphere is the same as
  - a. atmosphere
  - b. lithosphere
  - c. biosphere
  - d. hydrosphere
  
9. Life on earth depends on interaction of gravity and
  - a. one-way flow of energy
  - b. cycling of energy
  - c. one-way flow of matter
  - d. the destruction of matter
  
10. Large ecological regions with characteristic types of natural vegetation are called
  - a. ecosystems
  - b. communities
  - c. populations
  - d. biomes
  
11. The most inclusive components of the biotic portion of an ecosystem are
  - a. producers and consumers
  - b. primary and secondary consumers
  - c. herbivores, carnivores, and omnivores
  - d. all nonliving chemicals or matter
  
12. Most of the energy input in a food chain is
  - a. in the form of heat
  - b. converted to biomass
  - c. recycled as it reaches the chain's end
  - d. degraded to low-quality heat
  
13. An ecosystem can survive without
  - a. producers
  - b. consumers
  - c. decomposers
  - d. autotrophs

14. The pyramid which best explains why there are typically only four to five links in a food chain is the pyramid of
- energy
  - biomass
  - numbers
  - productivity
15. Of the following processes of the water cycle, the one working against gravity is
- percolation
  - infiltration
  - runoff
  - transpiration
16. The two ways in which humans have most interfered with the carbon cycle are
- removal of forests and aerobic respiration
  - aerobic respiration and burning fossil fuels
  - respiration and photosynthesis
  - burning fossil fuels and removal of forests and bush
17. Ammonium ions are converted to nitrite ions through the process of
- nitrification
  - nitrogen fixation
  - denitrification
  - assimilation
18. The major plant nutrient most likely to be a limiting factor is
- phosphorus
  - calcium
  - manganese
  - potassium
19. Which of the following best describe the biologists' current hypothesis about the production of the earth's atmospheric oxygen?
- photosynthesis by terrestrial plants produced atmospheric oxygen
  - the breakdown of iron ore deposits produced atmospheric oxygen
  - photosynthesis by cyanobacteria produced atmospheric oxygen
  - chemosynthesis by terrestrial plants produced atmospheric oxygen
20. Which of the following explain (s) the origin of organic molecules on earth?
- formation of organic molecules from gaseous inorganic molecules and energy source
  - formation of organic molecules around hydrothermal vents in the ocean floor
  - formation on dust particles in outer space
  - all the above

21. The changes in coloration within the population of peppered moths is an example of
- coevolution
  - microevolution
  - convergent evolution
  - macroevolution
22. Thriving coral reefs require
- cloudy water
  - cool water
  - dissolved oxygen and nutrients
  - salinity that fluctuates with the tides
23. In terms of biodiversity, the tropical rain forest is to land environments as ---- is to water environments
- the abyssal zone
  - the bathyal zone
  - the euphotic zone
  - the coral reef
24. Flying foxes are recognized as a
- thriving species
  - alien species
  - native species
  - keystone species
25. A new kitten is added to a home with an established older cat. You observe the older cat hiss and swat at the younger kitten where they are fed. This behavior is best described as
- interference competition
  - exploitation competition
  - mutualism
  - predation

**Total 25 Marks**

## QUESTION TWO

- A. Distinguish between ecology and environmental science (4 marks)
- B. Define
- earth capital;
  - solar capital;
  - carrying capacity;
  - environmental resistance; and
  - tragedy of the commons (10 marks)

C. Summarize the root causes of environmental problems (11 marks)

**Total 25 Marks**

QUESTION THREE

- A. Apply the second law of energy to food chains and pyramids of energy, which describe energy flow in ecosystems (4 marks)
- B. Explain how there may be exceptions to pyramids of numbers and biomass, but not energy (6 marks)
- C. What do you understand by ecosystem service? (2 marks)
- D. Give evidence that species diversity affects ecosystem stability (6 marks)
- E. Ecosystem balance is affected by forces that tend to increase population size and factors that tend to decrease it. Discuss this statement (7 marks)

**Total 25 Marks**

QUESTION FOUR

- A. Draw a detailed picture of the carbon cycle, and describe what happens during the various parts of the cycle (10 marks)
- B. Describe the theory of evolution under the following themes:
  - a. Charles Darwin (5 marks);
  - b. Natural selection (5 marks); and
  - c. Speciation (5 marks)

**Total 25 Marks**

QUESTION FIVE

- A. Relationships between predators and prey play an important role in the energy transfers that occur in ecosystems. They also influence the process of natural selection. Explain how predators affect the adaptations of their prey (8 marks)
- B. The relationship in (B) also works in reverse. How do prey species affect the adaptations of their predators? (8 Marks)
- C. Competition for a limited quantity of resources occurs in all ecosystems. This competition can be interspecific or intraspecific. Discuss some of the ways an organism might deal with these different types of competition (9 marks)

**Total 25 Marks**

**GOOD LUCK!!!!!!**