



UNIVERSITY OF SWAZILAND
Faculty of Health Science

Department of Environmental Health
Sciences

Main Examination 2010

Title of paper: ENVIRONMENTAL ECOLOGY 1

Course code: EHS 555

Time allowed: 2 hours

Marks allocation: 100 Marks

Instructions:

- 1) Question one and two are compulsory
- 2) Answer **ONLY FOUR** questions
- 3) Each question is weighted 25 marks
- 4) Write neatly and clearly
- 5) Begin each question in a separate sheet of paper

This paper is not to be opened until the invigilator has granted
permission

QUESTION ONE (COMPULSORY)

For each of the following, indicate the most appropriate answer by writing the question number and the letter of the correct answer next to it (E.g. 1. E).

1. A group of individuals of the species occupying a given area at the same time is called,
 - a. Species;
 - b. Population;
 - c. Community;
 - d. Genus.

2. 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.

3. All physical forms of water make up the
 - a. Atmosphere;
 - b. Lithosphere;
 - c. Biosphere;
 - d. Hydrosphere.

4. An ecosphere is the same as
 - a. Atmosphere;
 - b. Lithosphere;
 - c. Biosphere;
 - d. Hydrosphere.

5. Life on earth depends on the 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.

6. Large ecological regions with characteristic types of natural vegetation are called
 - a. Ecosystems;
 - b. Communities;
 - c. Populations
 - d. Biomes

7. A transitional zone between two ecosystems is called
 - a. A fragile ecosystem;
 - b. A biome;
 - c. An ecotone;
 - d. A buffer zone.

8. All of the following are major causes of differences among aquatic ecosystems except
 - a. Temperature;
 - b. Precipitation;
 - c. Salinity;
 - d. Depth of sunlight penetration.

9. Autotrophs
 - a. Might eat heterotrophs;
 - b. Are known as decomposers;
 - c. Cannot do photosynthesis;
 - d. Can live without heterotrophs.

10. You are a scientist intrigued by organisms that can create complex molecules through chemosynthesis. The habitat you are most likely to visit is
 - a. A chaparral biome;
 - b. An inland sand dune;
 - c. A hydrothermal vent;
 - d. A grassland biome.

11. Organisms that complete the final breakdown and recycling of organic materials from the remains or wastes of all organisms are called
 - a. Detritivores;
 - b. Carnivore;
 - c. Decomposers;
 - d. Scavengers.

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. Which of the following ecosystem has the lowest level of kilocalories per square meter per year?
 - a. Open ocean;
 - b. Tropical rain forest;
 - c. Agricultural land;
 - d. Lakes and streams.

14. Evidence for the evolution of life comes from all of the following except,
- Chemical experiments;
 - Fossils;
 - Chemical analysis of ancient rocks and core samples;
 - Environmental foot print.
15. Which of the following best describes 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.
16. The gas that is least likely to have formed earth's primitive atmosphere is
- Methane;
 - Ammonia;
 - Oxygen;
 - Water vapor.
17. The source of energy that probably contributed least to the synthesis of biological chemicals on primitive earth is
- Ultraviolet light;
 - Hydropower;
 - Radioactivity;
 - Lightning.
18. The following explain(s) the origin of organic molecules on earth except?
- Formation of organic molecules from gaseous inorganic molecules and an energy source;
 - Formation of organic molecules around hydrothermal vents in the ocean floor;
 - Formation of dust particles in outer space;
 - Formation of organic molecules on terrestrial ecosystems.
19. The oxygen revolution was most likely brought about by
- Lightning creating ozone;
 - Ultraviolet light breaking down ozone;
 - Chemosynthetic bacteria;
 - Cyanobacteria.
20. A change in the genetic composition of a population over successive generations is called
- Emigration;
 - Mutation;
 - Natural selection;
 - Evolution.

21. A gene pool is
- The collection of genes being used in the human genome project;
 - The genetic composition of an organism;
 - The genetic composition of a population;
 - The genetic composition of a community.
22. Biodiversity is believed to be the result of
- Divergent and convergent evolution;
 - Speciation and extinction;
 - Speciation and co-evolution;
 - Extinction and co-evolution.
23. The biome most likely to be found on top of Mount Kilimanjaro in Tanzania is
- Desert;
 - Tundra;
 - Grassland;
 - Temperate deciduous forest.
24. Thriving coral reefs require
- Cloudy water;
 - Cool water;
 - Dissolved oxygen and nutrients;
 - Salinity that fluctuates with the tides.
25. In ecological studies, what does richness refer to?
- The number of individuals of each species;
 - The number of different species;
 - The number of edge effects;
 - The number of ecotones in an area.

TOTAL 25 MARKS

QUESTION TWO (COMPULSORY)

- (a) What are the four components of biodiversity? (4 marks)
- (b) Discuss the importance of biodiversity highlighting
 - (i) the earth's life support system (5 marks)
 - (ii) the economy of a country? (5 marks)
- (c) What is speciation? (2 marks)
- (d) Differentiate between biological evolution, the theory of evolution, microevolution, and macroevolution (4 marks)
- (e) Describe how co-evolution is brought about? (5 marks)

TOTAL 25 MARKS

QUESTION THREE

- (a) What is a desert? (1 marks)
- (b) What are the three major types of desert (3 marks)
- (c) How do these types of desert (in b) differ in climate and biological makeup? (9 marks)
- (d) Discuss how desert (i) plants and (ii) animals are adapted to living in such ecosystems (12 marks)

TOTAL 25 MARKS

QUESTION FOUR

- (a) Define the following ecological terms
 - (i) Environmental management (2 marks)
 - (ii) An estuary (2 marks)
 - (iii) Ecological niche (2 marks)
 - (iv) Environmental indicators (2 marks)
 - (v) Endemism (2 marks)
 - (vi) Ecosystem (2 marks)
 - (vii) Ecological succession (2 marks)
- (b) Describe how communities differ in physical appearance and population distribution (5 marks)
- (c) Explain how primary succession takes place (6 marks)

TOTAL 25 MARKS

QUESTION FIVE

- a. List four factors that limit life at the different depths in aquatic life zones (4 marks)
- b. List and describe each of the biological zones found in the open sea (12 marks)
- c. In details, discuss the Tundra biome (9marks)

TOTAL 50 MARKS