



UNIVERSITY OF SWAZILAND

Faculty of Health Sciences

Department of Environmental Health Science

B.SC. DEGREE IN ENVIRONMENTAL HEALTH SCIENCE

**MAIN EXAMINATION PAPER DECEMBER 2017**

TITLE OF PAPER : ENVIRONMENTAL ECOLOGY

COURSE CODE : EHM 315

DURATION : 2 HOURS

MARKS : 100

INSTRUCTIONS : READ THE QUESTIONS & INSTRUCTIONS  
CAREFULLY  
: ANSWER QUESTIONS **ONE AND ANY OTHER THREE**  
QUESTIONS  
: EACH QUESTION **CARRIES 25** MARKS.  
: WRITE NEATLY & CLEARLY  
: NO PAPER SHOULD BE BROUGHT INTO 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.

**SECTION A: Multiple Choice (Compulsory)**

This section comprise of multiple choice questions. Write the question number on your answer script and write the letter of the correct answer next to it. Wrongly numbered questions and or unclear letters of the answer will be given a zero mark.

1. The most important factor in determining which biome is found in a particular area is
  - a. Soil type
  - b. Topography
  - c. Magnetic fields
  - d. Climate
2. Large ecological regions with characteristic types of natural vegetation are called
  - a. Ecosystems
  - b. Communities
  - c. Populations
  - d. Biomes
3. Aquatic life zones are the terrestrial equivalents of
  - a. Communities
  - b. Ecosystems
  - c. Biomes
  - d. Ecospheres
4. A transitional zone between two ecosystems is called
  - a. A fragile ecosystem
  - b. A biome
  - c. An ecotone
  - d. A buffer zone

5. The biome most likely to be found on the top of a very tall tropical mountain is the
  - a. Desert
  - b. Tundra
  - c. Grassland
  - d. Temperate deciduous forest
6. You are going on a scientific expedition from the equator to the North Pole. As you leave the coniferous forest behind, you anticipate next to explore
  - a. Gases captured in the ice
  - b. The fall of leaves from deciduous forest
  - c. Patterns of cone design in coniferous trees
  - d. The role of lichens and mosses in boggy ecosystems
7. Trees of wet tropical rain forest tend to be
  - a. Succulent plants
  - b. Broad-leaf evergreen plants
  - c. Broadleaf deciduous plants
  - d. Coniferous evergreen plants
8. A explorer seeking the driest place on earth should begin looking in a
  - a. Tundra
  - b. Savanna
  - c. Tropical desert
  - d. Temperate desert
9. If you were exploring a desert ecosystem, which of the following species would you least expect to find?
  - a. Creosote bush
  - b. Popular tree
  - c. Saguaro cactus
  - d. Prickly pear

10. In a chaparral, you are least likely to find
- Plants with large underground root systems
  - Mild, slightly wet winters
  - Long, hot, dry summers
  - Epiphytes and a dense understory
11. Which of the following statements is false?
- The existence, abundance, and distribution of a species in an ecosystem are determined by whether the levels of one or more physical or chemical factors fall within the range tolerated by a species
  - Organisms can adapt to slowly changing new conditions by acclimation
  - Too much or too little of any abiotic factor can limit or prevent growth of a population of a species in an ecosystem even if all other factors are at or near the optimum range of tolerance
  - There is no such thing as too much fertilizer
12. Evidence for the evolution of life comes from all of the following, except
- Chemical experiment
  - Fossils
  - Chemical analysis of ancient rocks and core samples
  - Natural selection
13. Birds and trout make good examples of
- Nonnative species
  - Native species
  - Keystone species
  - Indicator species
14. The ability of a population to maintain a certain size is known as
- Stability
  - Inertia
  - Constancy
  - Resilience

15. The following explains 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 on dust particles in outer space
  - Formation of organic molecules from natural selection
16. A change in the genetic makeup of a population over successive generations is called
- Emigration
  - Mutation
  - Natural selection
  - Evolution
17. The term that describes small genetic changes that a population within a species experiences is
- Coevolution
  - Microevolution
  - Convergent evolution
  - Macroevolution
18. The change from a light to dark colour in the peppered moth was the result of
- Insecticides
  - Industrial pollution
  - A change in predation
  - An increase in ultraviolet radiation

19. When natural selection results in a shift toward the average of a range of genetic expressions for a particular trait, an evolutionary ecologist like you would credit
- Stabilization natural selection
  - Discontinuous natural selection
  - Disruptive natural selection
  - Directional natural selection
20. You study fossils of giraffes. Although there appears to be considerable variability in lengths of necks, there appears to be a definite shift to longer necks over the course of time. You conclude that this species is undergoing
- Continuous natural selection
  - Discontinuous natural selection
  - Disruptive natural selection
  - Directional natural selection
21. Which one of the following is false? Coevolution
- Occurs when interacting species exert selective pressure on each other
  - Occurs between plants and the herbivore that eat them
  - May play a role in the evolution of camouflage
  - Leads to competitive relations
22. Species belonging to different taxonomic groups may develop a resemblance resulting from adaptation to similar environments. This process is called
- Coevolution
  - Microevolution
  - Convergent evolution
  - Macroevolution

23. Which of the following is false?
- a. Genetic diversity helps prevent a species from becoming extinct
  - b. The phenomenon in which animals with favorable adaptation reproduce more rapidly is called differential reproduction
  - c. Geographic isolation is a common mechanism contributing to speciation
  - d. By definition, the fittest animals are the largest and strongest animals
24. Darwin's description of macroevolution as an accumulation of steady, small evolutionary changes is best described as
- a. Dynamic equilibrium
  - b. A steady state hypothesis
  - c. A punctuated equilibrium hypothesis
  - d. A gradualist model of evolution
25. Biodiversity is believed to be the result of
- a. Divergent and convergent evolution
  - b. Speciation and extinction
  - c. Speciation and coevolution
  - d. Extinction and coevolution

**TOTAL 25 MARKS**

**SECTION B: Answer any three questions**

**QUESTION ONE**

1. List the:
- a. biotic components of an ecosystem **6 marks**
  - b. abiotic components of an ecosystem **6 marks**
2. Describe how the components listed in (a) and (b) above interact to govern the flow of energy through a food web. **13 marks**

**TOTAL 25 MARKS**

**QUESTION TWO**

1. Describe the process of natural selection **(14 marks)**
2. Describe the significance of adaptations to organisms and with examples explain how it reduces the vulnerability of an organism in the environment. **(11 marks)**

**TOTAL 25 MARKS**

**QUESTION THREE**

1. Use the concept of limiting factors to explain why certain plants and animals live in one type of habitat and not the other. Illustrate your answer with a diagram. **13 marks**
2. Describe the process of natural selection and explain how human activities such as livestock and crop breeding and the pollution of air and water affected the process of natural selection. **12 marks**

**TOTAL 25 MARKS**

**QUESTION FOUR**

In the morass of rapidly changing views of human population, there are a few well established facts about how to control human population growth. List the **traditional** and **modern** methods of controlling the growth of population. Of the listed **traditional and moderns**, briefly discuss **one of each** and indicate if it is efficient in controlling population growth.

**TOTAL 25 MARKS**