



**MASINDE MULIRO UNIVERSITY OF
SCIENCE AND TECHNOLOGY
(MMUST)**

UNIVERSITY EXAMINATIONS

2019/2020 ACADEMIC YEAR

**SPECIAL/SUPPLEMENTARY EXAMINATIONS
MAIN CAMPUS**

THIRD YEAR FIRST SEMESTER EXAMINATIONS

**FOR THE DEGREE
OF
BACHELOR OF SCIENCE IN MEDICAL BIOTECHNOLOGY**

COURSE CODE: BMB 313

COURSE TITLE: ENVIRONMENTAL BIOLOGY

D

INSTRUCTIONS TO CANDIDATES

Answer ALL questions in section A and ANY TWO selected from section B

TIME: 2 Hours

MMUST observes ZERO tolerance to examination cheating

This Paper Consists of 2 Printed Pages. Please Turn Over. 

SECTION A (MULTIPLE CHOICE QUESTIONS, 20 MARKS)

1. Imagine a square patch of habitat that is 9 hectare (ha). Edge effects are known to extend into the patch for 100 m, what is the area of the remaining core habitat (Hint: 1 ha = 100 X 100 m)?
 - a.) 8 ha
 - b.) 1 ha
 - c.) 3 ha
 - d.) 6 ha
2. Which of the following is the greatest threat to the loss of biodiversity?
 - a.) pollution
 - b.) disease
 - c.) genetic inbreeding
 - d.) habitat destruction/degradation
3. Which one of the following is one of the characteristics of a biological community?
 - a) Sex ratio
 - b) Stratification
 - c) Natality
 - d) Mortality
4. Highest biomass in aquatic ecosystems is attributed to which organisms?
 - a) Diatoms
 - b) Sea grass and slime molds
 - c) Nanoplankton, blue green algae, green algae
 - d) Benthonic and brown algae
5. The average trophic efficiency of transfer of energy from one trophic level to the other higher trophic level is called
 - a) Linderman's trophic efficiency rule
 - b) Exploitation efficiency
 - c) Assimilation efficiency
 - d) Gross primary production
6. Which of the following factors is causing the most extinction?
 - a) Pollution
 - b) Loss of habitat
 - c) Farts
 - d) They are dying of old age
7. Critically endangered species have:
 - a) 50% chance of survival for five years
 - b) 5% chance survival for five years
 - c) 75% chance of surviving for 100 years
 - d) 10% probability of becoming extinct for 100 years
8. How many species are estimated to be estimated to be extinct the year 2050?
 - a) 99%
 - b) 30%
 - c) 12%
 - d) 34%
9. Which of the following does not describe species based on the roles that they play within ecosystems
 - a) Foundation species
 - b) Keystone species
 - c) Mutualistic species
 - d) Endangered species
10. Lichens are important in the study of atmosphere pollution because they:
 - a) Can grow in greatly polluted atmospheres
 - b) Can readily multiply in polluted atmospheres

- c) Effectively purify the atmospheres
 - d) Are very sensitive to pollutants
11. Which one of the following organisms can serve as a biofertilizer for rice crop?
- a.) Blue-green algae
 - b.) Rhizobium sp.
 - c.) Mycorrhizal fungi
 - d.) Azotobacter sp
12. Within biological communities, some species are important in determining the ability of a large number of other species to persist in the community. Such species are called:
- a.) Keystone species
 - b.) Allopatric species
 - c.) Sympatric species
 - d.) Threatened species
13. Which of the following does not characterise areas of low diversity:
- a) Relatively few successful species in the habitat
 - b) The environment is quite stressful with relatively few ecological niches and only a few organisms are really well adapted to that environment
 - c) Food webs which are relatively simple
 - d) More ecological niches are available and the environment is less likely to be hostile
14. Which of the following is not a diversity index
- a) Simpson
 - B) Shannon
 - c) Margalef
 - d) Richness
15. Forest ecosystems provide the following functions except
- a) Oxygen production
 - b) Removal of carbon dioxide
 - c) Control of erosion
 - d) Lowers the diversity of plants and animals
16. Which of the following environmentalist first gave the concept of Biodiversity 'hotspots'?
- a) Gaylord Nelson
 - b) Norman Myres
 - c) John Muir
 - d) Jul
17. Which one of the following organisms can serve as a biofertilizer for rice crop?
- a.) Blue-green algae
 - b.) Rhizobium sp.
 - c.) Mycorrhizal fungi
 - d.) Azotobacter sp.
18. According to Shelford's Law of Tolerance, the organisms wide environmental factor tolerance limit show
- a) Narrow distribution with low population size
 - b) Wide distribution with high population size
 - c) Narrow distribution with high population size
 - d) Wide distribution with low population size
19. Which is not the characteristic of 'r' selected species?
- a) Reproduce quickly
 - b) Parental care
 - c) A low survival rate of progenies
 - d) Produce a large number of progenies
20. Lincoln index measures

- a) Population mortality rate
- b) Population natality rate
- c) Population size
- d) Population density

SECTION B (SHORT STRUCTURED QUESTIONS, 40 MARKS)

1. State five aspects that characterise areas with high species biodiversity (5marks)
2. Briefly explain with illustrations how biodiversity can be measured and monitored at different spatial scales (5marks)
3. State and briefly explain the various categories of ecosystems based on nature, duration and size (5marks)
4. Briefly explain why there is higher species diversity in regions with lower latitudes as compared to those areas of high latitudes (5marks)
5. State the application of high genetic/species diversity in relation to your course of study (5marks)
6. Briefly explain with an illustration factors that change the population size of individuals in a habitat (5marks)
7. State any five biodiversity indices that can be used to quantify biodiversity status in a named ecosystem and provide a weakness of each of the indices (5marks)
8. State any five effects of introduction of alien animals within any habitat (5 marks)

SECTION C (ESSAY QUESTIONS, 60 MARKS)

1. Describe the theory of Island Biogeography that has been used to describe the number of species on islands as described by Robert McArthur and Robert O. Wilson (20marks)
2. Describe any five international conventions that Kenya is a signatory to and has ratified by domesticating in its domestic laws on biodiversity conservation and management (20marks)
3. Describe the approaches that have been used as appropriate conservation efforts for effective ecosystem management at both local and landscape levels (20marks)