Reg. No._____

UNIVERSITY OF EMBU

2017/2018 ACADEMIC YEAR

SECOND SEMESTER EXAMINATIONS

THIRD YEAR EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE, BACHELOR OF SCIENCE (BIOLOGY) AND BACHELOR OF SCIENCE (ENVIRONMENTAL CONSERVATION AND NATURAL RESOURCES MANAGEMENT)

SBE 304 / SBT 305: POPULATION ECOLOGY / PLANT POPULATION ECOLOGY

DATE: APRIL 6, 2018 **TIME: 11: 00AM – 1:00 PM**

INSTRUCTIONS: Answer **ALL** Questions from **SECTIONS A** and **B**, and **ONE** Question selected from **Section C**.

SECTION A: Multiple Choice Questions (1 Mark each)
Please tick in the box opposite the correct answer.

1. A population will grow if …

   ☐ the birthrate and the death rate remain the same

   ☐ the birthrate becomes lower than the death rate

   ☐ the birthrate stays the same and the death rate increases

   ☐ the birthrate becomes higher than the death rate

2. A population will remain stable if …

- ☐ birthrate exceeds death rate
- ☐ death rate exceeds birthrate
- ☐ birthrate stays the same and the death rate increases
- ☐ birthrate and the death rate remain the same

3. The mortality rate of organisms following a type III survivorship curve is

- ☐ fairly constant throughout life
- ☐ higher in post-reproductive years
- ☐ lower after the organisms become established
- ☐ unrelated to age

4. What does not happen when population density increases?

- ☐ Toxic waste accumulation
- ☐ Mortality increase
- ☐ Predators tend to ignore prey that is overabundant
- ☐ Reproduction reduction

5. Which dispersion pattern is common in large natural populations?

- ☐ Random distribution
- ☐ Uniform distribution
- ☐ Clumped distribution
- ☐ All are equally common

6. _____is the number of individuals that an ecosystem can support indefinitely.

- ☐ Biotic potential
- ☐ Survivorship
- ☐ Carrying capacity
- ☐ Community

7. What do we call the movement of organisms into a given area from another area?

- ☐ Population Shift
- ☐ Immigration
- ☐ Emigration
- ☐ Carrying Capacity

8. _____is a life history pattern for species that reproduce once and then die.

- ☐ Fecundity
- ☐ Iteroparity
- ☐ Semelparity
- ☐ Density-independent

9. Which of the following populations is most likely to go extinct?

- ☐ A moderate-sized population of r-strategists
- ☐ A large population with lots of genetic variability
- ☐ A very small population in an unstable environment
- ☐ All would be equally likely to go extinct

10. Which of the following factors will affect population growth rates?

- ☐ Death rate
- ☐ Net immigration
- ☐ Birth rate
- ☐ All the above

11. What causes a sigmoid growth curve to level off?

- ☐ The population stops reproducing
- ☐ Mortality decreases in the population
- ☐ The population reaches the environmental carrying capacity
- ☐ Sigmoid growth curves never level off

12. What type of survivorship curve do most plants and animals in nature have?

- ☐ Type I
- ☐ Type II
- ☐ Type III
- ☐ All of the above

13. K-strategists tend to have

- ☐ a few offspring
- ☐ possess both delayed and repeated reproduction
- ☐ have a larger body size and slower development
- ☐ all of the above

14. Which of the following statements regarding survivorship curves is accurate?

- ☐ In Type III survivorship curves, many organisms survive youth but die during their elder years
- ☐ In Type II survivorship curves, organisms tend to die mostly during their younger years, but those that survive endure long lifespans.
- ☐ Species showing Type I and Type III survivorship curves both provide a great deal of parental care.
- ☐ Species with Type I survivorship curves usually have small quantities of offspring.

15. Which of the following best explains the difference between semelparous and and iteroparous species?

- ☐ Iteroparous species generally die after reproduction, while semelparous species do not.
- ☐ Iteroparous species put all of their resources into a single reproductive event, and semelparous species do not.
- ☐ Semelparous species generally have fewer offspring than iteroparous species.
- ☐ Semelparous species reproduce once in their lifetime, while iteroparous species reproduce multiple times.

SECTION B: SHORT ANSWER QUESTIONS (5 Marks Each)

Your answers should be brief and to the point (Use the examination answer book provided)

16. Contrast "difference" and "differential" equations as used in population ecology.

17. Using an illustration, describe survivorship curves.

18. Discuss Grime`s model of life histories variation in plants.

19. Using an illustration, describe a logistic growth model.

20. Describe the basis of a cohort life table.

21. Explain Allee effect and the propositions regarding the phenomenon.

SECTION C: ESSAY QUESTIONS (25 Marks Each)

Write an essay on any ONE of the following topics (Use the examination answer book provided)

22. Discuss properties of a population.

23. Discuss population regulation.

24. Using illustrations as may be appropriate, discuss the characteristics of metapopulations.

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