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 <u>MANAGEMENT</u>)

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

DATE: APRIL 6, 2018

TIME: 11: 00AM - 1:00 PM

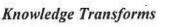
INSTRUCTIONS: Answer **ALL** Questions from **SECTIONS A** and **B**, and **ONE** Question selected from **Section C**.

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

- 1. A population will grow if ...
 - $\hfill\square$ the birthrate and the death rate remain the same
 - $\hfill\square$ the birthrate becomes lower than the death rate
 - $\hfill\square$ the birthrate stays the same and the death rate increases
 - $\hfill\square$ the birthrate becomes higher than the death rate



- 2. A population will remain stable if ...
 - □ birthrate exceeds death rate
 - □ death rate exceeds birthrate
 - \Box birthrate stays the same and the death rate increases
 - \Box 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
 - \Box higher in post-reproductive years
 - $\hfill\square$ lower after the organisms become established
 - $\hfill\square$ unrelated to age
- 4. What does not happen when population density increases?
 - □ Toxic waste accumulation
 - □ Mortality increase
 - $\hfill\square$ Predators tend to ignore prey that is overabundant
 - \Box Reproduction reduction
- 5. Which dispersion pattern is common in large natural populations?
 - $\hfill\square$ Random distribution
 - Uniform distribution
 - □ Clumped distribution
 - \Box 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
 - \Box 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
 - \Box 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
 - $\hfill\square$ 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
 - \Box All of the above
- 13. K-strategists tend to have
 - □ a few offspring
 - $\hfill\square$ possess both delayed and repeated reproduction
 - \Box have a larger body size and slower development
 - $\hfill\square$ 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.
 - \square 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.

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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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Knowledge Transforms

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