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RAJARATA UNIVERSITY OF SRI LANKA
FACULTY OF APPLIED SCIENCES

B.Sc. in Health Promotion
Second Year - Semester II Examination – September/October 2020

BIO 2204 –ECOLOGY

Time: Two (02) hours

Answer FOUR (04) of the following questions
Illustrate your answers with suitable diagrams where appropriate.

$$T = \sum_{x=0}^{n} xl_x m_x \Big/ R_0 \qquad R_0 = \sum l_x m_x$$

1. a) List **five (05)** different types of population interactions providing an example for each.

(25 marks)

b) i. Birds find shelter and build nests in trees without harming them. What is the term for the symbiotic relationship between the birds and the trees? **(05 marks)**

ii. Provide a brief explanation of this type of interaction. **(10 marks)**

c) Write a brief account on ecological competition and its impact on community structure.
(60 marks)

2. a) Define the term succession. **(05 marks)**

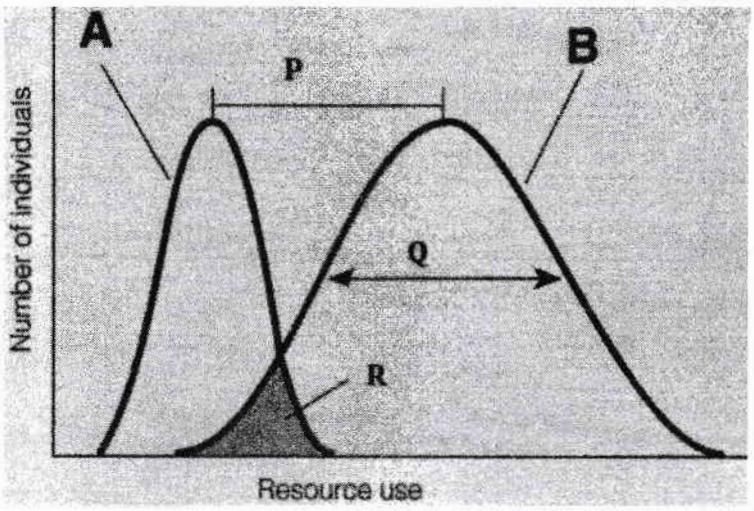
b) List **five (05)** differences between primary and secondary ecological succession.
(10 marks)

c) Explain the characteristics features of different stages of ecological successions
(35 marks)

d) Describe the ecological importance ecological succession using suitable examples.
(50 marks)

3. a) Differentiate an ecological niche and a habitat. **(10 marks)**

b) i) In the following figure, **A** and **B** represent two niches. Assign appropriate label for each letter in the figure. **(14 marks)**



ii) Explain citing suitable examples the reasons for organism having different niches. **(45 marks)**

iii) Indicate which organisms occupying the niches indicated above are most prone to extinction. Explain your choice. **(31 marks)**

4. A research was conducted on Species **X** in the Mahakanadarawa and Mihintale tanks. The Kanadarawa population is a natural population of species **X** characterized by slow growth and late maturity. The tank is relatively protected and is closed to fishing. Conversely, the Mihintale population consists of mostly hatchery-raised fish and is characterized by fast growth and early maturity. The tank is open to fishing and anthropogenic activates are occurring in the area.

Saman has collected the following **age-structure and Fecundity** information on species **X** in the Kanadarawa and Mihintale tanks: (i.e., assuming a 50:50 sex ratio)

Age	Kanadarawa Tank	Fecundity Kanadarawa	Mihintale Tank	Fecundity Mihintale
0	3000	0	8000	0
1	200	0	250	0
2	150	0	100	0
3	75	0	50	0
4	70	0	5	500
5	45	0	1	500
6	31	0	-	-
7	14	220	-	-
8	10	220	-	-
9	6	220	-	-
10	1	220	-	-

a) Draw survivorship curves for these cohorts and identify the types of survivorship curve.

(20 marks)

b) Construct a life table for the cohort species X and find the stable age structure of these two populations. Are these populations increasing, decreasing, or relatively stable? Give reasons.

(40 marks)

c) Calculate the net reproductive rate, intrinsic rate of increase, and finite rate of population change for these two populations. Define each of these parameters.

(40 marks)

5. Read the following passage which describes some of the feeding relationships in a pond.

> Microscopic plants are eaten by tadpoles, water fleas and mosquito larvae. Insects such as water beetles and water boatmen feed on the tadpoles. Small fish prey on the water fleas and mosquito larvae. Large fish feed on the small fish, water beetles, water boatmen and tadpoles.

a) Construct a food web using the information in the passage. **(30 marks)**

b) Explain, what will happen to the food web when all the tadpoles die in the pond?.

(30 marks)

c) Discuss the impact of heavy metal contamination in the above pond ecosystem.

(30 marks)

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