



FACULTY	AGRICULTURE, ENGINEERING & NATURAL SCIENCES
DEPARTMENT	ENVIRONMENTAL SCIENCE
SUBJECT	ENVIRONMENTAL BIOLOGY FOR EDUCATORS
SUBJECT CODE	EBE 3772
DATE	NOVEMBER 2021
DURATION	3 Hours
MARKS	120

REGULAR EXAMINATION

Examiners: Ms. C. Deelie, Dr. D. Kavishe, Dr L. Hart & Ms. S. Kapala (University of Namibia)

Moderator: Dr. W. C. Nesongano (University of Namibia)

This examination paper consists of 6 pages (including this front page)

Instructions

- **Section A: Compulsory**
- **Section B: Answer TWO questions only**

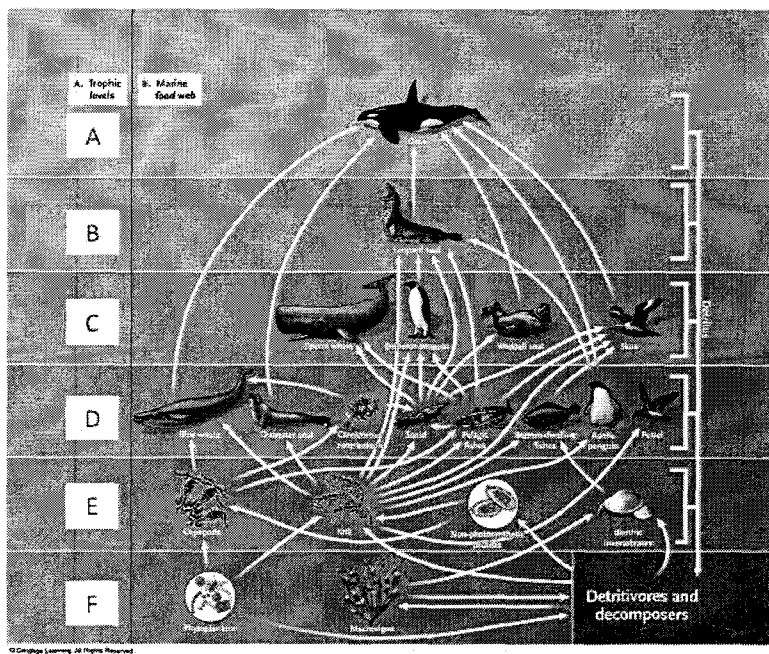
SECTION A (Total Marks 60)
Answer all questions from this section

Question 1: [15]

1.1. Match the term in the column on the left (1-5) with the correct definition in column on the right (a-e). Answer by writing the number with the correct corresponding letter (5)

- | | |
|----------------------------------|--|
| 1. Emigration. | (a) Population increasing steadily by a constant ratio |
| 2. Age specific Fecundity | (b) the average number of offspring produced by females during each age interval |
| 3. Exponential population growth | (c) population growth slows as population approaches K |
| 4. Logistic model | (d) the number of individuals per unit area or unit volume |
| 5. Population density | (e) movement out of a population |

1.2 Answer the question using the accompanying figure. Match the correct trophic level in the food web to the appropriate feeding relationship. (6)



- (a) quaternary consumers
- (b) Primary consumers
- (c) Top predators

- (d) Tertiary consumers
- (e) Primary producers
- (f) Secondary consumers

1.3 Explain continentality as a factor responsible for arid environments. (4)

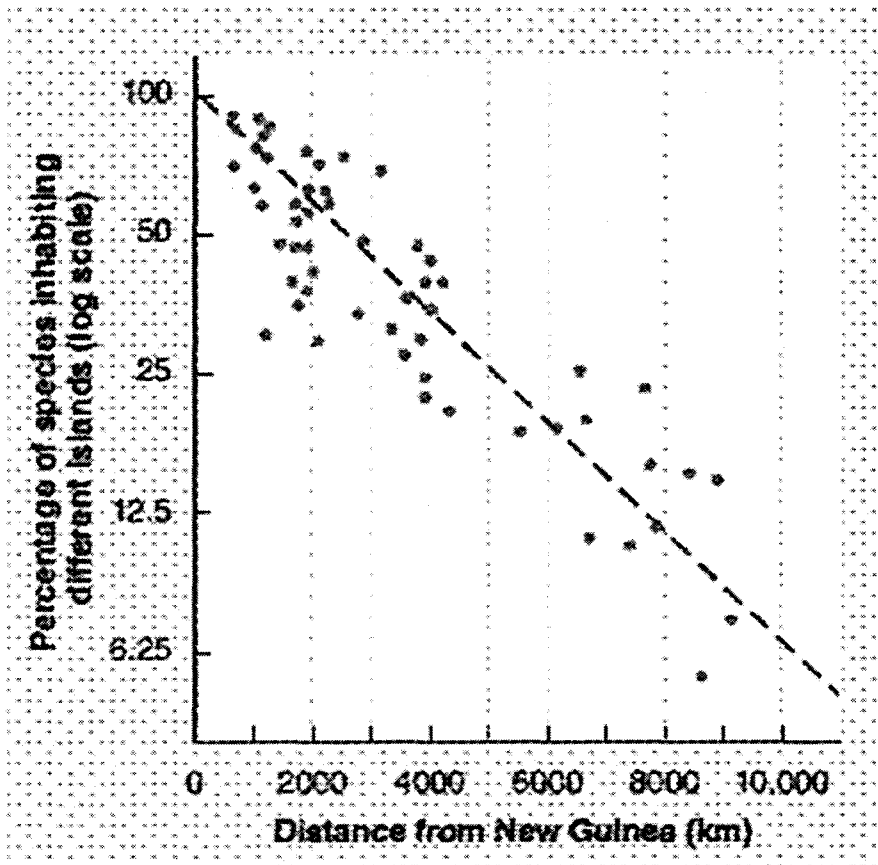
Question 2: [15]

2.1 What is the difference between a food chain and a food web? (5)

2.2 Match each of the following terms with its correct definition. (6)

- | | |
|-------------------------|--|
| 1. Ecosystem services | (a) non-native organisms in an ecosystem |
| 2. Restoration | (b) In danger of extinction throughout all or a significant portion of its range |
| 3. Endemic species | (c) indirect benefits from normal activity of ecological processes |
| 4. Endangered species | (d) Used to determine how large a population must be to ensure its long-term survival |
| 5. Exotic species | (e) interdisciplinary science that focuses on the maintenance and preservation of biodiversity |
| 6. Conservation biology | (f) Replanting of trees in habitat corridors between forests fragments. |

2.3 Use the accompanying figure to summarize the key concepts relating to species richness from studies of birds in the South Pacific islands. (4)



Question 3: [15]

3.1 Match the term in the column on the left (1-5) with the correct definition in column on the right (a-e). Answer by writing the number with the correct corresponding letter. (5)

- | | |
|------------------------|---|
| 1. Species diversity | a. number of species in a community |
| 2. Species abundance | b. number of individuals of a given species in a given area |
| 3. Species evenness | c. the way the total number of individuals is distributed among the species |
| 4. Species richness | d. measures both the number of species and relative abundance |
| 5. Species composition | e. types of species present in a community |

3.2 Explain how the net primary productivity of an ecosystem is calculated?. (3)

3.3. What is the relationship of food webs to biological magnification of toxins? (7)

Question 4: [15]

4.1 (a) What type of population dispersion is most common,? (2)

(b) How does the area sampled affect how dispersion appears to a researcher? (6)

4.2 Which organochlorine pesticide characteristics make it a threat to biodiversity? (4)

4.3 What makes Namibia specifically prone to desertification? (3)

SECTION B (TOTAL MARKS (60))
Answer any TWO of the following questions

Question 1: [30]

1.1 Deforestation leads to many undesirable effects on humans, the ecosystem and its processes. Discuss the impact of Deforestation on the following: (15)

- a) Land and Soil Degradation
- b) Effects on the Carbon Cycle and Climate Change
- c) Shortage of Wood

1.2 Discuss how the following should be considered when designing a reserve. (15)

- a) Vegetation Corridors
- b) Buffer Zones
- c) Heterogeneity of reserves

Question 2: [30]

Describe the five levels of ecological organization in the context of the biosphere and biomes.

(30)

Question 3: [30]

3.1 According to literature humans have two options for limiting population growth:

- 1) make a global effort to limit our own population, or
- 2) can wait until the environment does it for us.

Briefly explain :

(a) Which methods would result in a successful global decline in birthrate? (8)

(b) Which environmental events are the alternatives? (7)

3.2 Describe the carbon cycle and indicate how human activities upset the natural balance of the carbon cycle. (15)