UNAM
UNIVERSITY OF NAMIBIA

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**

SUPPLEMENTARY / SPECIAL EXAMINATION

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This question paper consists of 5 pages including this front page

Instructions

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

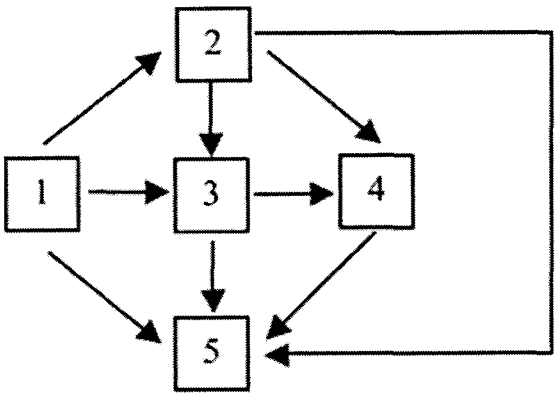
SECTION A (Total Marks 60)
Answer <u>all</u> questions from this section

Question 1: [15]

1.1. What is the difference between a decomposer and a detritivore? (6)

1.2 Use the following figure to answer the questions.

Food web for a particular terrestrial ecosystem (arrows represent energy flow and numbers represent species)



(a) In the food web, if species 3 is toxic to predators, then which species is most likely to benefit from being a mimic of species 3? (1)

(b) Which species in the food web most likely represents both a primary and secondary consumer? (1)

(c) Which species in the food web most likely represents a primary producer? (1)

1.3 Contrasts two forests, each with 10 species and a total of 50 trees. In the first forest, 39 of the 50 trees represent the dominant species. The second forest has 5 of each of the 10 different species.

What conclusion can be drawn regarding these two forests regarding?

(a) Species richness (3)

(b) Species diversity (3)

Question 2: [15]

2.1 Match the type of species interaction with the correct description. (10)

(a) Orchids growing in trees.

(b) Mussels dominating rocks along the shoreline

(c) Bats feeding on fruit.

(d) Antelope and wildebeest gazing together.

(e) Large fish feeding on small fish.

(f) Feather mites feeding on birds.

(g) Echinoderm feeding on dead food matter on the sea floor.

(h) Nitrogen-fixing bacteria and legumes.

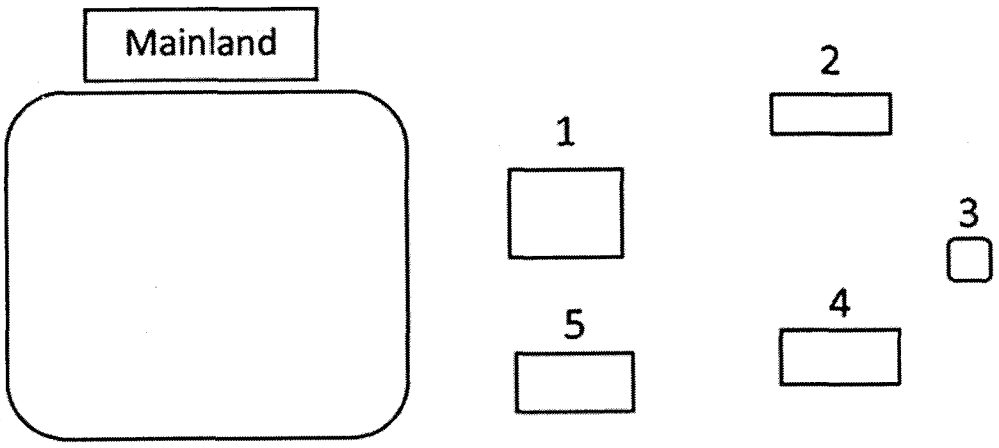
(i) Five granivorous species feeding in the same habitat.

(j) Pollinating fly resembles a bee.

2.2 Explain why is the productivity poor in the deeper parts of the ocean? (5)

Question 3: [15]

3.1 Use the following diagram of five islands formed at around the same time near a particular mainland, as well as the principles of MacArthur and Wilson's island equilibrium model, to answer the question.



(a) Which region would likely have the greatest species diversity? (2)

(b) Which island would likely encounter the highest rate of species extinction if these islands were subject to unregulated, commercial logging in the rainforest? (2)

(c) Which island would likely have the lowest extinction rate? (2)

3.2. According to the island equilibrium model, species richness would be lowest on an island with which characteristics? (2)

3.3 Why do islands experience high rates of extinctions? (2)

3.4 Explain coevolution as it relates to predator-prey interactions. Include a brief discussion of two specific examples. (5)

Question 4: [15]

4.1 Name the type of survivorship curve that human exhibit and factors involved. (5)

4.2 (a) What are some density-dependent factors that affect humans at higher population densities? (2)

(b) How have these been addressed in industrial societies? (3)

4.3 Identify FIVE environmental factors that influence biodiversity in Namibia. (5)

SECTION B (TOTAL MARKS (60)
Answer <u>any TWO</u> of the following questions

Question 1: [30]

1.1 Trophic levels form the basis of food chains and food webs.

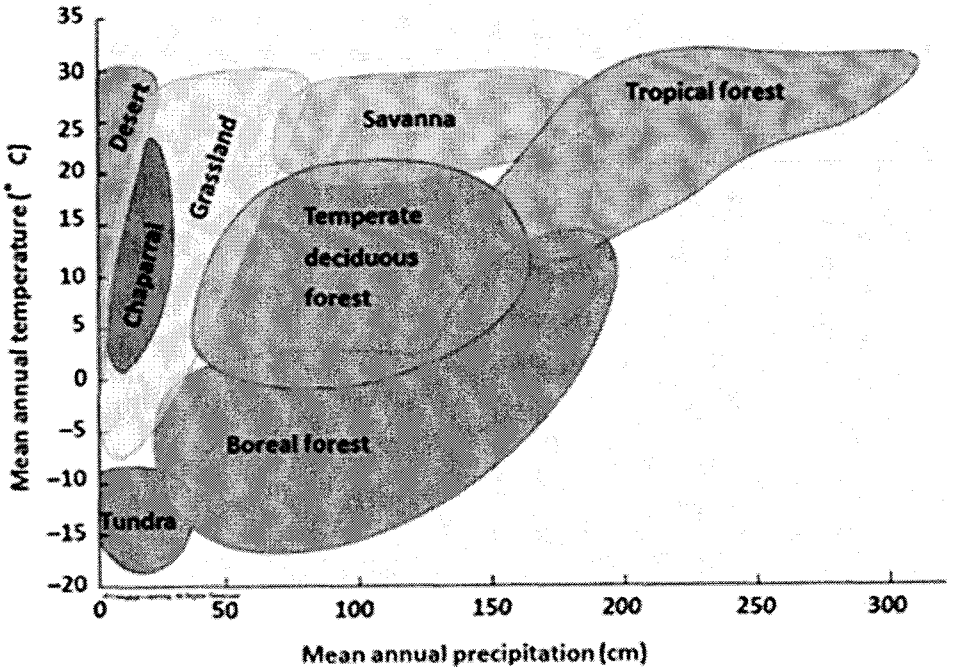
(a) Thoroughly discuss and give examples of the four trophic levels plus decomposers. (8)

(b) Use a specific ecosystem (such as the desert, forest, etc.) to show the relationships between the various levels. Make sure you use real plants and animals as examples. (7)

1.2 Differentiate between density-dependent and density-independent factors affecting population growth. Provide two examples for each, along with a brief explanation. (15)

Question 2: [30]

Describe the climate, soil, and representative organisms for two of the following terrestrial biomes: savanna, temperate rain forest, chaparral, or taiga. (30)



Question 3: [30]

Namibia and other drier countries of the world are at high risk of desertification. Discuss the following manifestations of desertification critically: (30)

(a) Land degradation

(b) Floods

(c) Bush encroachment

[60]