

A Local Ecosystem – Topic Test

Name: _____

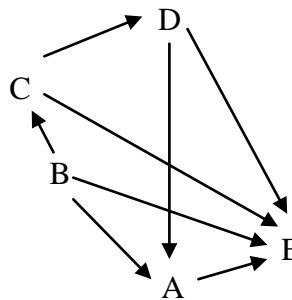
Total Marks: _____

50

SECTION 1: Multiple Choice Questions (10 marks)

Choose the **best** alternative and circle your choice. (1 mark each)

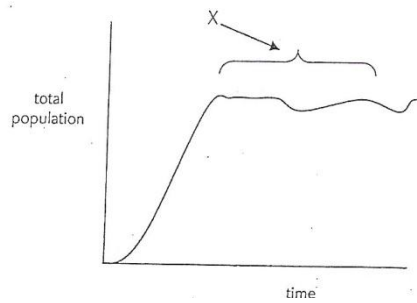
1. The diagram below shows a food web found in a particular ecosystem.



From this diagram, we can conclude that A, B and C, respectively are:

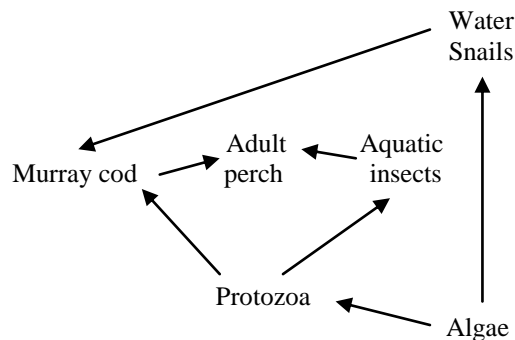
- A) A producer, a herbivore and a decomposer
 - B) An omnivore, a producer and a herbivore
 - C) A decomposer, a carnivore and a producer
 - D) A herbivore, a decomposer and an omnivore
2. Organism E in question 1 is:
- A) A producer
 - B) A herbivore
 - C) A decomposer
 - D) A carnivore
3. The most appropriate method for estimating a population of a fixed plant species would be:
- A) The random quadrat method
 - B) The 'capture-recapture' method
 - C) Estimating the percentage cover of the species
 - D) Drawing a line transect
4. Many eucalypt species produce toxic chemicals that inhibit the growth of seedlings of other species underneath their canopies. This is an example of:
- A) Mutualism
 - B) Commensalism
 - C) Parasitism
 - D) Alleopathy
5. Three biotic factors that can affect the distribution and abundance of a particular species are:
- A) Competition, temperature, and type of vegetation present
 - B) Predation, competition and disease
 - C) Rainfall, available light and soil depth
 - D) Salinity, competition and available food

6. The growth curve below shows the changes in an insect population over time.



The levelling off of the curve at 'X' is most likely due to:

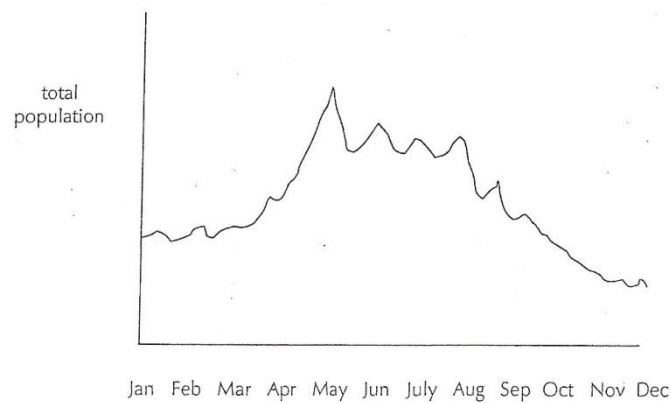
- A) Competition within the species for the same resources
 - B) The introduction of a predator species
 - C) A sudden change in one of the abiotic features of the ecosystem
 - D) Migration of the insect species to another ecosystem
7. The diagram below shows a typical food web from a freshwater ecosystem.



The earliest effect of a sudden decrease in the adult perch population would be:

- A) An increase in the Murray cod population
 - B) A decrease in the protozoan population
 - C) A decrease in the population of aquatic insects
 - D) An increase in the biomass of algae
8. 25 members of a fish population are captured and tagged. They are then released. Some time later, 15 fish are recaptured. Of these, five are tagged. The best estimate for the total fish population would be:
- A) 45
 - B) 40
 - C) 75
 - D) 125
9. Which of the following is not an adaptation to reduce water loss?
- A) A reduced number of sweat glands
 - B) The production of concentrated urine
 - C) A small body size
 - D) Leaves that are narrow or reduced to spines

10. The curve below shows changes in the numbers of unicellular alga, *Chlamydomonas*, in North American waters over a one-year period.



The increase in numbers of *Chlamydomonas* between April and August is most likely due to:

- A) An increase in herbivorous water snails
- B) An increase in the amount of organic food matter
- C) An increase in the temperature of surface waters during this period
- D) A decrease in the amount of dissolved nutrients available

SECTION 2: Free Response Questions (40 marks)

Answer each question in the spaces provided.

1. The table below shows the numbers of two insect species found in a particular ecosystem over a period of 9 weeks.

Week	Species A	Species B
1	17	28
2	23	139
3	22	218
4	19	161
5	11	175
6	13	275
7	10	219
8	0	218
9	0	219

a) Draw population curves for each species by plotting these figures on the same set of axes. (2 marks)

b) Use your graph to deduce the type of relationship that exists between species S and species B. Give a reason for your answer. (2 marks)

2. During your field study of a local ecosystem you measured some of its abiotic factors. Briefly explain how you would measure the following: (1 mark each)

Temperature _____

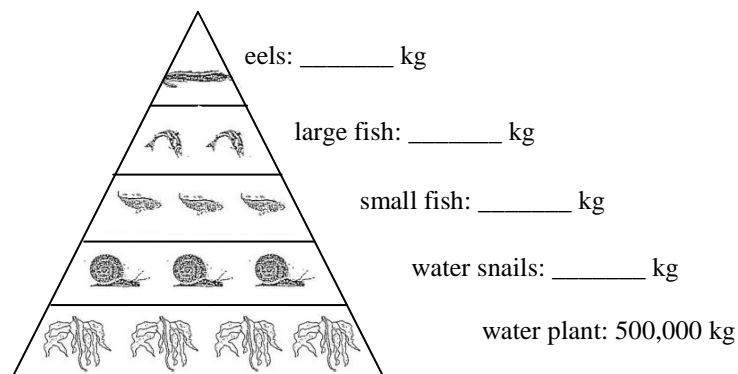
Moisture _____

Acidity _____

Wind speed/exposure _____

3. a) Is energy cycled through an ecosystem? Explain. (2 marks)

b) Complete the biomass pyramid for the freshwater community shown below. Assume 90% of the mass from each trophic level is lost before the next level is reached. (2 marks)



4. An ecosystem is often defined as a group of organisms interacting with each other and their non-living surroundings. In other words, an ecosystem consists of biotic and abiotic components.

a) Outline one way in which the distribution and abundance of a terrestrial organism is affected by: (2 marks)

i) A named biotic factor _____

ii) A named abiotic factor _____

b) Outline one way in which the distribution and abundance of an aquatic organism is affected by: (2 marks)

i) A named biotic factor _____

ii) A named abiotic factor _____

5. Briefly describe four ways in which humans have adversely affected natural ecosystems. (4 marks)

- _____

- _____

- _____

- _____

6. The diagram below represents a population of native grass plants within a 100m² area. Each square represents a 1m² quadrat and each cross depicts one plant. Use the quadrat method to estimate the total plant population. Set out your results in the table provided. (4 marks)

xx		x	xx		x	xx	xx	xx	xx
x				xx	xx			x	x
xx		x		x		x	xx		x
	x		x		x	x	xx		x
xxx	x			x				x	
	x		x		xx		x	x	
	xxx			xxx					x
	x	xx	xx					xxx	
X			x	x	x	x			
x	x			xx	xxx	xx	xx	x	x

Number of random quadrats sampled	Average number of plants per m ² quadrat	Estimate of total number of plants per 100m ²

7. Draw a food web for the ecosystem described below. (4 marks)

In a particular forest ecosystem, leaf eating insects feed on the leaves of Eucalyptus trees, while sap-sucking insects feed on the sap of these trees. Starlings eat both types of insect, and these birds are in turn preyed upon by goshawks. Spiders that live in the trees feed on wasps and the leaf-eating and sap-sucking insects. The wasps are sometimes observed to eat the sap-sucking insects.

8. a) Briefly outline the importance of decomposers in ecosystems. (3 marks)

b) Draw in appropriate arrows to include a decomposer organism in the food web you completed in question 17.

9. Explain how the following adaptations assist the organisms described to survive in their environments. (1 mark each)

a) The kangaroo rat, a desert mammal burrows underground in daylight hours. _____

b) During cold conditions, some animals reduce the amount of blood flowing to the skin's surface. _____

c) Freshwater fish often produce dilute urine. _____

d) The leaves of rainforest trees often have a large surface area. _____

10. Define the following relationships and give a specific example for each. (1 mark each)

a) **Mutualism** _____

b) **Parasitism** _____

c) **Commensalism** _____

d) **Alleopathy** _____

