

AICE Biology: Biodiversity, Conservation, and Classification Problem Set

Answer the following AICE practice questions as well as **all end of chapter questions for chapter 18**. This assignment is due with your test on biodiversity and conservation on Friday, January 12, and is worth **30 points**.

1

(a) Complete the passage with the most appropriate term.

Within each ecosystem there is a of organisms that interact with each other and with their environment. Each species fills a particular within the ecosystem. Feeding relationships in food webs are an example of the interactions species have with each other. In old field ecosystems in North America, producers, such as blue grass, provide energy for grazing animals. These animals form the in the food chain. [3]

(b) Very little of the energy consumed by grazing animals is available to carnivores.

State two reasons why this is so.

- 1.
 - 2.
- [2]

[Total: 5]

2

(a) State the term for each of the following:

- (i) all organisms of the same species living in a defined area at a particular time.
..... [1]
- (ii) the interaction of all living organisms with each other and their non-living environment in a self-contained location
..... [1]
- (iii) the process of converting nitrate ions in soil to nitrogen gas in the atmosphere.
..... [1]

Mangroves are trees which grow on tropical coastlines in salt water.

Fig. 6.1 shows part of a food chain from a mangrove area.

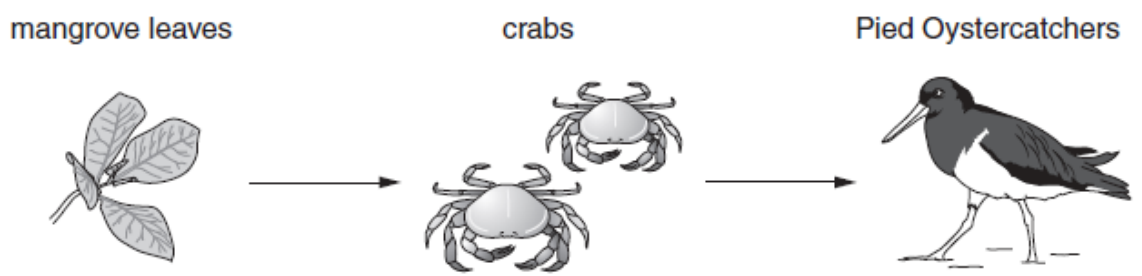


Fig. 6.1

- (b) (i) Name the trophic level of the Pied Oystercatchers.
..... [1]
- (ii) Explain why the energy taken in by the crabs is not all available to the Pied Oystercatchers.
.....
.....
.....
.....
.....
.....
..... [2]

3

The Ethiopian wolf, *Canis simensis*, is a member of the Canidae family of carnivores.

Fig. 1.1 shows an Ethiopian wolf.



Fig. 1.1

- (a) Ethiopian wolves evolved from an ancestor similar to the grey wolf that crossed into Northern Africa from Europe about 100 000 years ago.

They live in the alpine grasslands and heathlands at, or above, 3000m altitude in Ethiopia.

State the most likely type of speciation that led to the evolution of the Ethiopian wolf.

.....[1]

- (b) A population of Ethiopian wolves is called a pack.

Heterozygosity has been found to be low in all of the packs of Ethiopian wolves that have been studied.

Suggest why the heterozygosity may be low in Ethiopian wolf packs.

.....
.....
.....
.....
.....[2]

- (c) The Ethiopian wolf is classified as an endangered species by the International Union for the Conservation of Nature and Natural Resources (IUCN). It publishes an annual list of endangered species called the Red List.

Complete Table 1.1 to summarise four of the main reasons, with further explanation, as to why the Ethiopian wolf has become an endangered species.

Table 1.1

reason	explanation
	an activity that accompanies human expansion and reduces the size of the wolf habitat
rabies, a lethal viral disease of wolves	
	a human activity to control wolves, considered to be pests
	the result of wolves breeding with domestic dogs

[4]

- (d) According to the Red List, the number of endangered mammal species in 2007 was 349 and in 2008 was 448.

Calculate the percentage increase in endangered mammal species between 2007 and 2008.

Give your answer to the **nearest whole number**.

Show your working.

answer% [2]

[Total: 9]

4

(a) The squirrel monkey, *Saimiri sciureus*, of Costa Rica has become an endangered species.

Fig. 1.1 shows a squirrel monkey.



Fig. 1.1

Explain what is meant by the term *endangered species*.

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.....

.....[2]

(b) Discuss possible ways in which the squirrel monkey could be protected.

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.....

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.....

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.....[4]

[Total: 6]

5 Corals are simple marine animals and usually exist in colonies of thousands of individuals.

Fig. 1.1 shows a coral colony.



Fig. 1.1

Corals absorb calcium carbonate from the sea to build their skeletons, which help to form large coral reefs. Coral reefs provide a home for about 25% of known fish species and have the highest biodiversity of any marine ecosystem.

(a) Corals, although they are animals, are sometimes mistaken for members of the plant kingdom.

State two ways in which corals differ from plants.

.....
.....
.....
..... [2]

(b) Outline what is meant by the term ecosystem.

.....
.....
.....
..... [2]

- (c) Coral reefs are at risk of damage due to human activities. All the coral reefs in three regions were classified as being at low, medium or high risk of damage.

Table 1.1 shows the areas of coral reef at risk of damage in these three regions.

Table 1.1

region	area of coral reef at risk of damage ($\times 10^3 \text{ km}^2$)			percentage of coral reef at high risk of damage
	low	medium	high	
Caribbean Sea	9	8	7	29
Indian Ocean	20	15	10	
Pacific Ocean	60	30	9	

- (i) Complete Table 1.1, giving your answers, to the nearest whole number. [1]
- (ii) Suggest how human activities could damage coral reefs.

.....

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..... [3]

[Total: 8]

Table 5.2

taxon	number of species	total number of individuals
Coleoptera (beetles)	113	2 197
Diptera (flies)	58	1 029
Formicidae (ants)	14	7 467
Hemiptera (bugs)	121	11 875

(i) Complete Table 5.1 by calculating the mean number of insect species for *Acacia tortilis*. [1]

(ii) Select, from Tables 5.1 and 5.2, a name to fit the following taxonomic groups:

a genus

a species

[2]

(iii) Comment on the effects of sample size on the quality and accuracy of the data in Table 5.1.

.....
.....
.....
.....
.....[2]

(c) This study was carried out in Mkomazi Game Reserve in Tanzania.

Suggest how research into insect diversity on *Acacia* trees is relevant to the conservation of bigger animals in the reserve, such as elephants.

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.....[3]

Palm oil is an edible vegetable oil that comes from the fruit of oil palm trees.

- Palm oil is cheap.
- It is the world's most widely used vegetable oil.
- The yield of oil per hectare from oil palm trees is thirty times more than that of oil from maize.
- Around 85% of the world's palm oil is now produced in Indonesia.

Table 8.1 shows the change in forest cover on the three main Indonesian islands between 2000 and 2010.

Table 8.1

	island		
	Sumatra	Borneo	Java
area of island /million hectares	42	72	12
forest cover in 2000 /million hectares	15	33	3
forest cover in 2010 /million hectares	12	27	1
loss of forest cover between 2000 and 2010 /million hectares	3	2
percentage loss of forest cover between 2000 and 2010	20	67

- (a) Complete Table 8.1 to show the loss of forest cover **and** the percentage loss of forest cover for Borneo between 2000 and 2010. [2]
- (b) The Sumatran forest is the natural habitat for the Sumatran orangutan, *Pongo abelii*.

Fig. 8.1 shows a Sumatran orangutan.



Fig. 8.1

The Sumatran orangutan is classified as critically endangered on the IUCN Red List of Threatened Species. Loss of forest cover can separate family groups from other groups.

(i) Suggest the genetic consequences of the separation of family groups.

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..... [3]

(ii) Suggest ways in which the Sumatran orangutan can be protected in its **natural** environment.

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..... [3]

(iii) Describe the role of zoos in the protection of endangered species such as the Sumatran orangutan.

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..... [3]

[Total: 11]

(a) Explain what is meant by the terms *ecosystem* and *niche*. [7]

(b) Describe the sampling techniques that could be used to measure the distribution and abundance of organisms in a habitat. [8]

[Total: 15]