

The Challenge of Ecosystems – MARK SCHEME

Question 1

Using Figure 6, which one of the following statements is true?

One mark for the correct answer:

B. The largest single area of tropical rainforest is in South America.

No credit if two or more statements are shaded

Question 2a

Using Figure 6, which one of the following statements is true?

One mark for the correct answer:

C. Moles eat beetles

No credit if two or more statements are shaded.

Question 2b

Suggest what would happen in the food web shown in Figure 6 if foxes became extinct.

One mark for each basic point or two marks for developed suggestion.

Possible increase in the number of some primary and secondary consumers (1), particularly moles/rabbits

(d) (1)

There would be fewer predators (1)

Increase in number of moles/ rabbits (1)

However the number of beetles might eventually decrease (1)

Possible fewer plants as numbers of primary consumers / rabbits increase (1)

Fewer beetles means fewer mice / tawny owls (1).

Question 3a

Using Figure 7, calculate the temperature range in Place A.

8.5 (°C)

Working and units not needed.

Question 3b

Using Figure 7, state two differences between the climate in Place A and Place B.

Rainfall is (much) lower in Place A, (totalling 27 mm per year in comparison to 213 mm in Place B). (1)

The variation in rainfall is (much) higher in Place B (19mm) than Place A (8mm) (1)

The highest average temperature in Place A is 23.9°C compared with 6.2°C in Place B (1)

The lowest average temperature is (much) lower in Place B (-14.5°C) compared with Place A (at 15.4°C).(1)

Place B has a higher yearly temperature range (of 20.7°C compared to 8.5°C in Place A).

B has wetter climate (1). B has a cooler climate (1)

2 clear contrasts (differences) are needed for 2 marks

Question 4a

Using Figure 5, describe the location of areas with low biodiversity levels.

Low levels are found in (hot and cold) desert areas (1) such as the Sahara/Arabian/Atacama desert (d) (1)

Mountainous areas have low levels (1) such as the Himalayas/Andes (d) (1)

Tundra/polar areas have low levels (1) such as northern Canada/northern Russia/Greenland/Antarctica (d) (1)

Much of northern Africa/northern Canada has low biodiversity levels (1)

Areas inside the Arctic Circle have low levels (1)

Max 1 mark for list of locations.

Credit two separate points or one developed point for 2 marks

No credit for explanation of biodiversity levels.

Question 4b

Using Figure 5, suggest one reason for the high biodiversity levels in area X.

Area X receives very high rainfall (1) which allows many plants to grow (d)(1).

Area X experiences high temperatures and high rainfall (1) which means that plants grow rapidly (d) (1).

Area X receives some rain in every month (1) which means that plants grow throughout the year (d) (1).

There is a hot wet climate (1) which leads to the growth of many plants in a tropical rainforest (d) (1).

Question 5a

Which global ecosystem is most likely to have the temperature and precipitation pattern shown in Figure 7?

The question requires application of knowledge and understanding to **Figure 7**.

One mark for the correct answer:

B. Tundra

No credit if two or more statements are shaded.

Question 5b

State the minimum temperature shown in Figure 7.

One mark for the correct answer:

C. -30°C

No credit if two or more statements are shaded

Question 5c

Give one reason why polar regions have low temperatures throughout the year.

(The low angle of the sun means) energy is more dispersed (less concentrated) on the earth's surface (1).

The sun's energy is scattered and reflected by the atmosphere (1).

Ice, water and snow are good reflectors of solar radiation (1).

Because of the tilt of the earth, polar regions receive no sunlight for up to 6 months of the year (1).

Reject idea that polar regions are further from sun than equatorial regions.

Question 6

State one role of decomposers in an ecosystem.

Decomposers help to return nutrients/energy to the soil (1)

They break down dead plants and animals/organic waste or excreted material (1)

They release energy from a plant or animal so that it can be recycled. (1)

Question 7

Calculate the percentage loss in biomass between the primary consumer and secondary consumer levels.

B. 97.5%

No credit if two or more statements are shaded.

Question 8

Give two reasons why the biomass changes between each level in the food chain.

E.g. (Loss of energy through) respiration (1)

(Loss of energy through) movement (1)

(Loss of energy through) excretion (1)

(Loss of energy through) digestion (1)

Energy loss through heat (1)

Energy is used for life processes (1)

Faeces and remains are passed to decomposers (1)

The entire organism is not consumed or digested / Parts such as roots, woody stems, bones, scales, feathers aren't eaten. (1)

Question 9

What is the role of producers in an ecosystem?

One mark for an appropriate description of the role.

Producers are organisms that produce their own food (1)

They convert the sun's energy into food (1)

They produce food for other animals to eat (1)

They produce chemical energy by the process of photosynthesis (1)

They convert water, sunlight and CO₂ into carbohydrates (1)

Plants can also make other nutrients for other organisms to eat (1)

They are at the bottom of the food chain and may be eaten by consumers (1)

Do not credit examples of producers.

Question 10

Which global ecosystem matches the following description?

An area with trees which drop their leaves in winter.

Shade one circle only.

C Deciduous forest

No credit if two or more answers are circled.

Question 11

For a small scale ecosystem you have studied, name one producer and one consumer.

Producer: Any green plants, lichens and algae, phytoplankton, seaweeds, sea grass. Max 1 mark for producer.

Consumer: Any part of the ecosystem that feeds from the producer such as flea, tadpoles, fish, heron etc. The answer does not have to be a primary consumer. Max 1 mark for consumer.

Both species should be found in the same ecosystem.

Max 1 mark if the two species are not from same ecosystem.

Question 12

Which one of the following phrases defines the term biodiversity?

One mark for the correct answer:

B. The number and types of plants and animals that live in an area.

No credit if two or more statements are shaded.