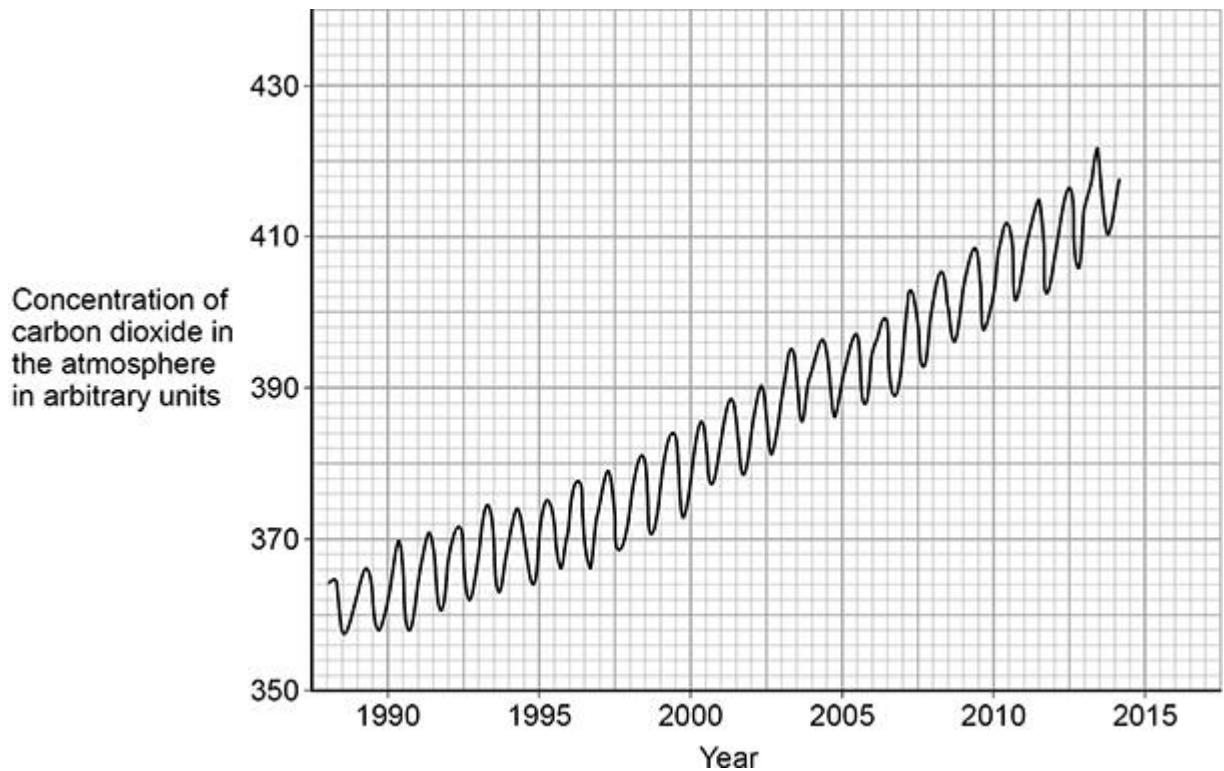


B18- Biodiversity and ecosystems- Exam Practice 1

Q1.

Scientists are very concerned about the changes in concentration of carbon dioxide in the Earth's atmosphere.

The graph below shows the concentration of carbon dioxide in the atmosphere between 1988 and 2014.



- (a) Describe **two** patterns shown in the graph above.

Use data from the graph above in your answer.

1 _____

2 _____

(4)

- (b) Give **two** human activities that affect the concentration of carbon dioxide in the

atmosphere.

1 _____

2 _____

(2)

(c) The trend shown in the graph above may continue for many years.

Explain what effect the changing concentration of carbon dioxide in the atmosphere could have on living organisms.

(4)

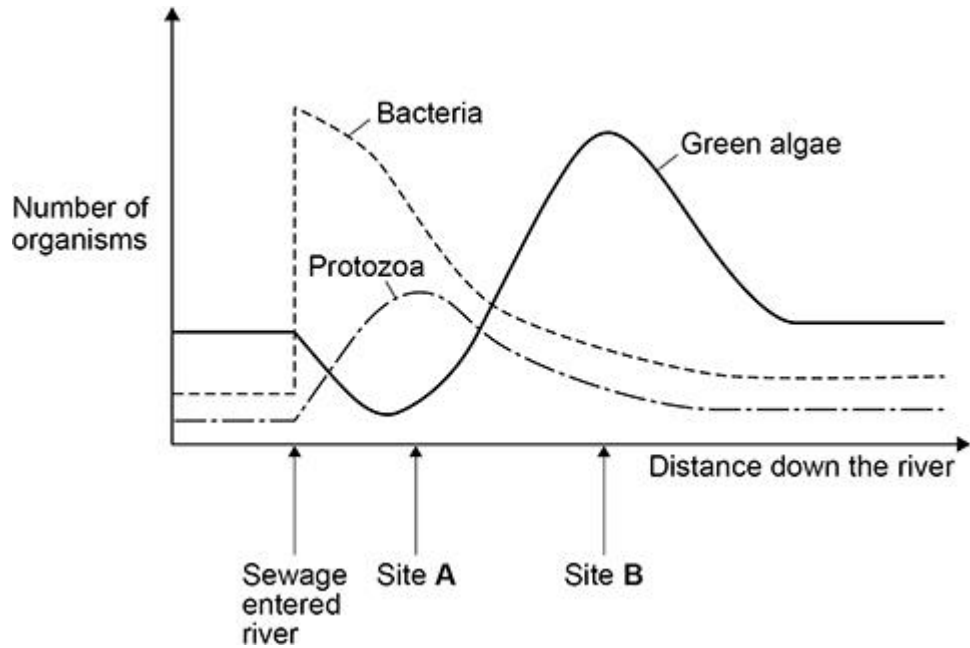
(Total 10 marks)

Q2.

Rivers are sometimes polluted with untreated sewage.

Figure 1 shows some changes that occurred when untreated sewage entered a river.

Figure 1



- (a) Which type of organism had the most rapid increase in numbers when sewage entered the river?

Tick (✓) **one** box.

Bacteria

Green algae

Protozoa

(1)

- (b) Protozoa are single-celled organisms.

Describe **two** ways **Figure 1** shows that the protozoa in the river feed on bacteria.

1 _____

2 _____

(2)

- (c) When sewage enters a river, the concentration of dissolved oxygen decreases. The decrease in oxygen concentration is caused by organisms in the water.

What process in living organisms uses oxygen?

(1)

- (d) As the numbers of green algae in the river increase, the concentration of dissolved oxygen increases.

Explain why the concentration of dissolved oxygen increases.

(2)

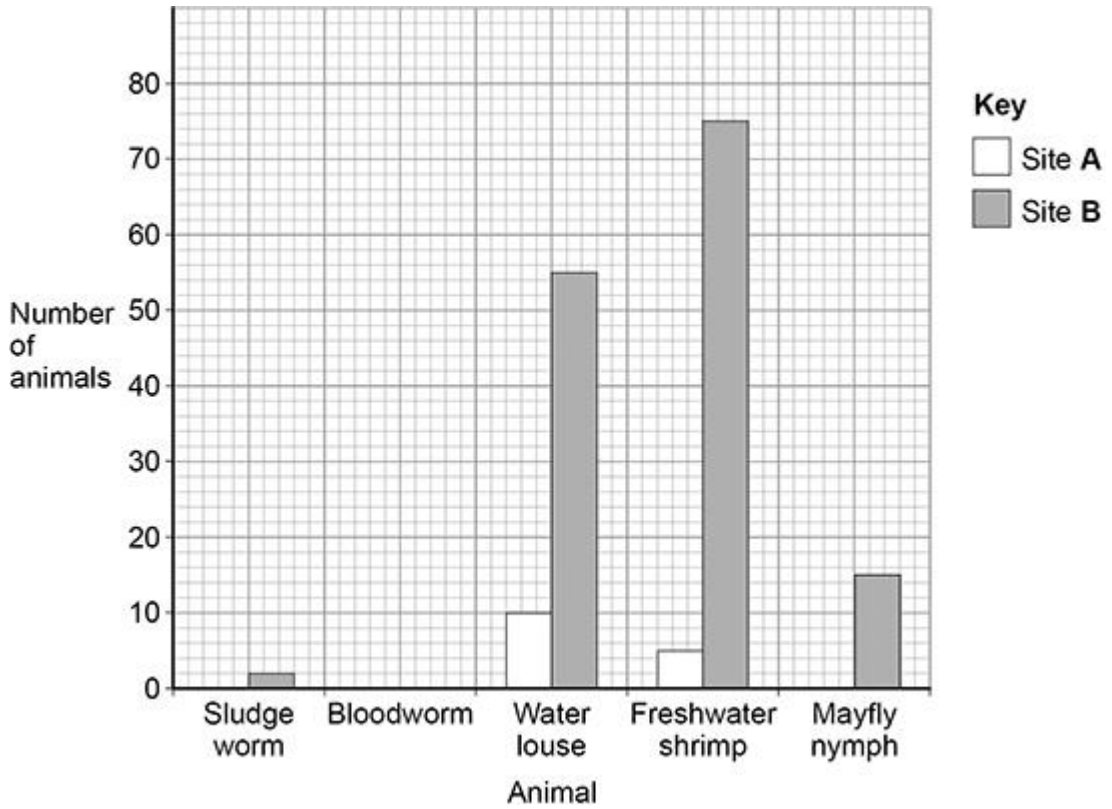
Scientists counted the numbers of five different animals in the river at sites **A** and **B**, shown in **Figure 1** above.

The table below shows the results.

Animal	Number of animals	
	Site A	Site B
Sludge worm	80	2
Bloodworm	36	8
Water louse	10	55
Freshwater shrimp	5	75
Mayfly nymph	0	15

Figure 2 shows some of the data from above table.

Figure 2



(e) Complete **Figure 2**.

You should use data from above table for the sludge worm and the bloodworm.

(2)

(f) The concentration of oxygen in the water at site **A** is much lower than at site **B**.

- Sludge worms live in places which have a low concentration of oxygen.
- Mayfly nymphs need a high concentration of oxygen.

Give evidence from the table above for the difference in oxygen concentration at sites **A** and **B**.

Refer to sludge worms and to mayfly nymphs in your answer.

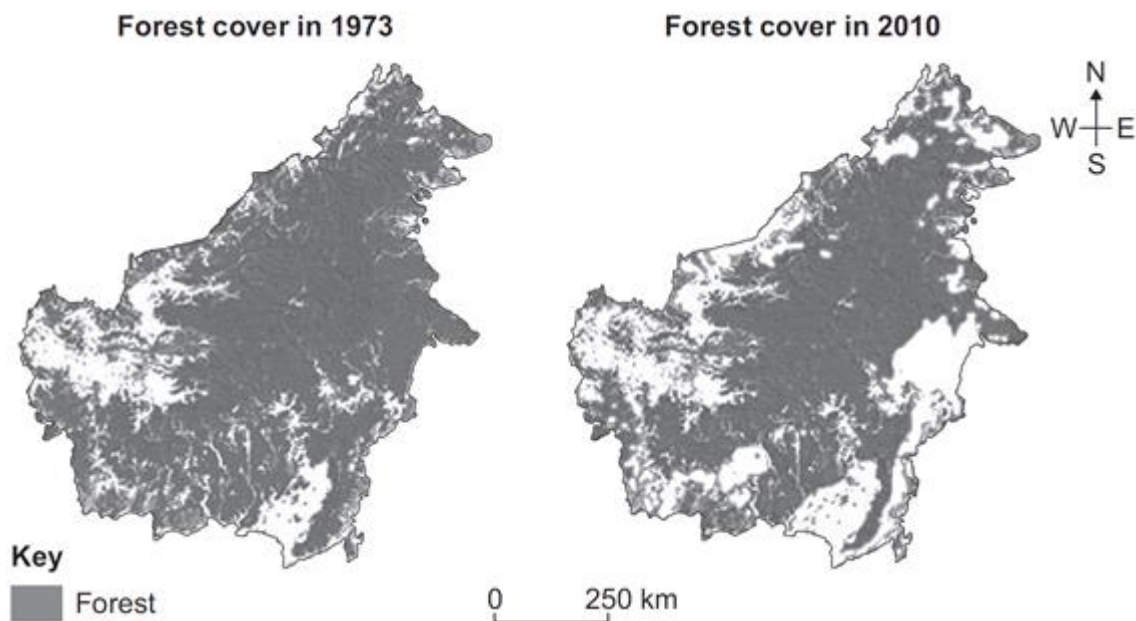
(2)

(Total 10 marks)

Combined Higher Questions

Q3.

The figure below shows the amount of forest cover on an island in Asia, in 1973 and in 2010.



- (a) (i) Deforestation has decreased the amount of forest cover on the island.

Describe the change in the pattern of forest cover on the island.

(2)

- (ii) Give **two** possible reasons why the amount of forest has decreased between 1973 and 2010.

1. _____

2. _____

(2)

- (b) Scientists are concerned about the effects of a decrease in forest cover on ecosystems.

Give **two** possible negative effects of the decrease in forest cover on ecosystems.

1. _____

(6)
(Total 10 marks)

Mark schemes

Q1.

- (a) (overall) increase (in concentration of CO₂) 1
- (overall increase) by 54 (arbitrary units)
allow in range 45 to 65 (arbitrary units)
- or**
from 364 to 418 (arbitrary units)
allow from 357 to 422 (arbitrary units)
allow other correct data 1
- peaks and troughs
allow description 1
- each cycle is 1 year
- or**
variation per cycle is 8 to 16 (arbitrary units)
allow multiples such as 5 cycles every 5 years
allow answer in range 8 to 16 (arbitrary units) 1
- (b) combustion
- allow a named example such as burning (named) fuels*
or *driving cars*
or *power stations*
ignore factories unqualified 1
- deforestation
allow a description
*allow human activities that decrease carbon dioxide concentration such as tree-planting **or** growing crops*
if no other mark awarded allow respiration for 1 mark 1
- (c) **Level 2:** Relevant points (reasons / causes) are identified, given in detail and logically linked to form a clear account. 3-4
- Level 1:** Points are identified and stated simply, but their relevance is not clear and there is no attempt at logical linking. 1-2
- No relevant content** 0

Indicative content

- (higher CO₂ concentration causes) global warming
- plants photosynthesise faster
 - due to more CO₂
 - due to higher temperature
- temperature rise causes changes in rainfall patterns **or** extreme weather conditions such as storms
- less rainfall causes desertification
 - many plant species die out
 - many animal species lack food and die
 - other (drought-adapted) plants become more common
- more rainfall causes flooding
 - loss of habitat
 - may lead to extinction
- temperature rise melts (polar) ice caps **or** glaciers
 - causes flooding
 - loss of habitat
 - may lead to extinction
- changes in animal / bird migration patterns / times **or** changes in distribution of animals

[10]

Q2.

- (a) bacteria 1
- (b) any **two** from:
- bacteria increase **before** protozoa increase
or
when bacteria are high, protozoa increase
*allow protozoa increase **after** bacteria increase*
 - as protozoa increase, bacteria decrease
 - (after site **A**) as bacteria decrease, protozoa also decrease
allow when bacteria are low, protozoa are low
- 2
- (c) (aerobic) respiration
*do **not** accept anaerobic respiration*
- 1
- (d) (algae carry out) photosynthesis
- 1
- (which) produces oxygen
allow algae produce oxygen
- 1

- (e) bars plotted correctly
allow a tolerance of $\pm \frac{1}{2}$ a small square
ignore column widths 1
- suitable shading 1
- (f) more sludge worms at **A** (than at **B**)
*allow fewer sludge worms at **B** (than at **A**)*
*allow high number of sludge worms at **A** and low number at **B*** 1
- no mayfly nymphs at **A** and mayfly nymphs present at **B**
*allow more mayfly nymphs at **B** (than at **A**)* 1
- answers must be comparative*

[10]

Q3.

- (a) (i) forest at the edges (of the island) has been removed
allow centrally the forest remains 1
- an appropriate area on the island is identified eg south east **or** bottom right 1
- (ii) any **two** from:
 - (to provide land) for farming / agriculture
 - (to provide land) for quarrying
 - (to provide land / wood) for building
allow to provide timber
 - to provide fuel
 - to produce paper
allow forest fires 2
- (b) any **two** from:
 - decreased biodiversity
 - loss of habitats
 - increased carbon dioxide (concentration)
 - global warming
allow effects of global warming eg flooding / rise in sea level
allow soil erosion 2

[6]

Q4.

- (a) carbon dioxide **or** acidic gas(es)
allow other named example of acidic gas such as sulfur dioxide
allow chemical formula e.g. SO₂

allow carbon monoxide
allow particulates / smoke / soot
allow methane / CFCs

1

(b) any **three** from:

- fertiliser
allow nitrate / phosphate
- sewage
allow organic matter / faeces / urine / urea
- toxic chemicals
*allow a named toxic chemical such as mercury **or** sulfur dioxide **or** acid rain*
- herbicide
- fungicide
allow insecticide
allow oil
allow nuclear waste
allow other examples of water pollutants
if herbicide / fungicide / insecticide not given allow (named) pesticide for 1 mark

3

(c) **Level 2:** Scientifically relevant facts, events or processes are identified and given in detail to form an accurate account.

4–6

Level 1: Facts, events or processes are identified and simply stated but their relevance is not clear.

1–3

No relevant content

0

Indicative content

air pollution:

(carbon dioxide **or** methane **or** greenhouse gases)

- global warming / climate change / traps heat
 - floods / fire / drought **or** ice caps melt **or** rise in sea level **or** extreme weather
 - loss of habitat / food
 - migration

(acidic gas / named – e.g. SO₂ / NO_x)

- damage to leaves so less photosynthesis
- damage to roots or alters ions in soil (/ e.g. phosphates / iron)
 - (so) less protein manufacture
- damage to lungs
 - breathing difficulties / bronchitis / asthma

(carbon monoxide)

- combines with haemoglobin
 - less oxygen carried (by haemoglobin / blood)

(particulates / 'soot')

- cover leaves **or** block light
 - less photosynthesis so less glucose made
- damage to lungs
 - breathing difficulties / bronchitis / asthma

water pollution:

(sewage)

- bacteria multiply
 - use oxygen in respiration
 - water animals cannot respire
 - pathogens in water

(fertiliser)

- algae multiply
 - (algae) block light so plants cannot photosynthesise
 - lack of oxygen for respiration – fish die

(toxic substances)

- damages / harms cells **or** bioaccumulation
 - interferes with metabolism – e.g. respiration / protein synthesis
- (plastics)
- entrap animals or causing internal damage if swallowed

(particles)

- block light
 - plants / algae cannot photosynthesise so less glucose made

(oil)

- damages birds' feathers
 - cannot fly so cannot find food **or** escape predators

(acid rain / acids)

- lowers pH of water
 - damages fish gills
 - bleaches coral

[10]