Mark schemes

Q1.

(a) any **one** from:

- sun
- light

ignore photosynthesis

1

(b)

Feeding relationship	Organism	
Secondary consumer	lynx	
Primary consumer	(snowshoe) hare	1
Producer	grass	
Herbivore	(snowshoe) hare	1
Carnivore	lynx	
Prey	(snowshoe) hare	1
Predator	lynx	

*if no other mark awarded allow **1** mark for 3 correct answers*

Up to 3

(c) camouflaged / hidden **or** not (easily) seen

allow description eg blends in with surroundings

1

from lynx / predator / carnivore

1

not killed / eaten

allow less likely to be killed / eaten

1

(d) any **two** from:

- fewer lynx (to eat them)

  *allow not many predators / lynx do **not** accept no lynx / predators*

- more food / grass (available)

  allow a lot of food / grass

- hares reproduce / breed / multiply

2

(e) (number of lynx) increases

1

(f) less food **or** fewer (snowshoe) hares (to eat) **or** fewer prey

ignore the lynx were hunted

*do **not** accept no food*

1

(g) any **two** from:

- (lost in) respiration (of snowshoe hare)

  allow as carbon dioxide
- egestion / faeces

  allow not all digested
- excretion / urea / urine
- not all eaten

  allow not all (named) parts eaten

2

*if no other mark awarded, allow **1** mark for waste*

[13]

Q2.

(a) a community

1

(b) brambling and chaffinch

1

(c) the brambling and the bullfinch cannot breed together to give fertile offspring

1

(d) constant (from Jan) to Mar / (mid-)Apr

ignore straight

1

increases (from mid-)Apr to / and May

1

decreases from May / Jun to Dec

1

allow answers in terms of month numbers

ignore seasons

*if no other marks awarded allow for **1** mark constant, **then** increase **then** decrease*

(e) B

1

(f) D (because) present only May to Sep

allow D (because) present only May to Oct

*allow D (because) **not** present Oct to Apr / May*

allow D (because) present only in summer

*allow D (because) **not** present in winter*

allow D (because) not present for all the year

allow D (because) only present for some of the year

1

[8]

Q3.

(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 ± ½ 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]

Q4.

(a) **abiotic**

any **two** from:

- water
  - *allow moisture / humidity / rain(fall)*
  - *allow dryness*
- oxygen / air (in soil)
  - *ignore carbon dioxide*
- pH (of soil)
  - *allow acidity / alkalinity (of soil)*
- minerals / ions
  - *allow salts*
  - *allow named example of an ion*
  - *ignore nutrients*
- temperature
- size of soil particles **or** texture / type of soil
  - *allow named examples of soil types*
  - *ignore space / toxins / weather*

2

biotic

any **two** from:

- food
  - *allow amount of dead / decaying matter (in soil)*
  - *ignore nutrients*
- predators / consumers / carnivores
  - *allow example − such as birds*
- disease / pathogens / bacteria / fungi
  - *allow microorganisms / microbes / parasites /*

2

*if **no** other marks awarded allow **2** marks for **four** factors in reverse categories*

(b) **Level 3:** The method would lead to the production of a valid outcome. The key steps are identified and logically sequenced.

5–6

Level 2: The method would not necessarily lead to a valid outcome. Most steps are identified, but the method is not fully logically sequenced.

3–4

Level 1: The method would not lead to a valid outcome. Some relevant steps are identified, but links are not made clear.

1–2

No relevant content

0

Indicative content

- same concentration of chemical / **X** applied to the soil
- same volume / amount of chemical / **X** applied to the soil
- same size of area sampled – eg 1 m^2 or 0.25 m^2
- use of a quadrat
- same time between application and collecting worms
- same time allowed for collecting worms after application

- each sample area selected randomly
- method of achieving randomness – eg random coordinates

- (collect and) count worms in each of areas **A** and **B**

- at least 5 repeats in each of areas **A** and **B**
- calculate mean (per unit area) **or** total for each of areas **A** and **B**
- compare means / totals for areas **A** and **B**

[10]