

- M1.** (a) methane is produced  
*ignore bad smell* 1
- which is a greenhouse gas / causes global warming 1
- (b)  $(9.80 / 0.20 = 49 \text{ therefore})$  49:1 1
- (c) horse (manure)  
*allow ecf from 11.2*
- closest to 25:1 (ratio) 1
- (d) **Level 3 (5–6 marks):**  
A detailed and coherent explanation is given, which logically links how carbon is released from dead leaves and how carbon is taken up by a plant then used in growth.
- Level 2 (3–4 marks):**  
A description of how carbon is released from dead leaves and how carbon is taken up by a plant, with attempts at relevant explanation, but linking is not clear.
- Level 1 (1–2 marks):**  
Simple statements are made, but no attempt to link to explanations.
- 0 marks:**  
No relevant content.
- Indicative content**
- statements:**
- (carbon compounds in) dead leaves are broken down by microorganisms / decomposers / bacteria / fungi
  - photosynthesis uses carbon dioxide
- explanations:**

- (microorganisms) respire
- (and) release the carbon from the leaves as carbon dioxide
- plants take in the carbon dioxide released to use in photosynthesis to produce glucose

**use of carbon in growth:**

- glucose produced in photosynthesis is used to make amino acids / proteins / cellulose
- (which are) required for the growth of new leaves

6

(e) any **three** from:

(storage conditions)

- (at) higher temperature / hotter
- (had) more oxygen
- (had) more water / moisture
- (contained) more microorganisms (that cause decay)

*allow reference to bacteria / fungi / mould*

3

[13]

M2.	(a)	(i)	counts / 12	1
			<ul style="list-style-type: none"> <li>× 120 × 80 / × 9600</li> <li><b>or</b></li> <li>× area of field</li> </ul>	1
		(ii)	(more) quadrats / repeats	1
			<ul style="list-style-type: none"> <li>placed randomly</li> <li><i>ignore method of achieving randomness</i></li> </ul>	1
	(b)	(i)	<ul style="list-style-type: none"> <li>any <b>three</b> from:</li> <li>• temperature / warmth / heat</li> <li>• water / rain</li> <li>• minerals / ions / salts (in soil)</li> <li><i>allow nutrients / fertiliser / soil fertility</i></li> <li><i>ignore food</i></li> <li>• pH (of soil)</li> <li>• trampling</li> <li>• herbivores</li> <li><i>ignore predators</i></li> <li>• competition (with other species)</li> <li>• pollution qualified e.g. SO<sub>2</sub> / herbicide</li> <li>• wind (related to seed dispersal).</li> <li><i>ignore space / oxygen / CO<sub>2</sub> / soil unqualified</i></li> </ul>	3
		(ii)	light needed for photosynthesis	1
			for making food / sugar / etc.	1
			effect on buttercup distribution eg more plants in sunny areas / fewer plants in shady areas	1
	(c)	(i)	fertiliser / ions / salts cause growth of algae / plants	1
			(algae / plants) block light	1
			(low light) causes algae / plants to die	

- 1
- microorganisms / bacteria feed on / break down / cause decay of organic matter / of dead plants  
*do not allow germs / viruses*
- 1
- (aerobic) respiration (by microbes) uses O<sub>2</sub>  
*do not allow anaerobic*
- 1
- (ii) sewage / toxic chemicals / correct named example eg metals / bleach / disinfectant / detergent etc  
*allow suitable named examples eg metals such as Pb / Zn / Cr / oil / SO<sub>2</sub> / acid rain / pesticides / litter*  
*ignore chemicals unqualified*  
*ignore waste unqualified*  
*ignore human waste / domestic waste / industrial waste unqualified*
- 1
- (d) (i) 2
- 1
- (ii) more food  
*allow other sensible suggestion eg more species colonise from tributary streams after forest*
- 1
- (iii) number of stonefly species decreases (from **A** to **B** / **B** to **C** / **A** to **C**) as more pollution enters river / less oxygen  
*allow fewer species in more polluted water*  
*ignore none are found at site C*
- 1

[19]

**M3.** (a) (rapid) growth in population (size)

1

increase in the standard of living

*accept description of increased standard of living, eg more packaging, more food thrown away or overbuying resources*

1

(b) (i) 41.5

*allow 1 mark for  $9733 \div 23454$*

**or**

*allow 1 mark for 0.415*

**or**

*allow 1 mark for 41.49 **or** 41 **or** 41.4*

2

(ii) any **four** from arguments for:

- there has been a reduction in total waste
- there has been an increase in (total mass of) recycling
- there has been an increase in the percentage of waste recycled
- it (may) not be possible to achieve zero waste.

arguments against:

- there is still a lot of waste (not recycled)
- there has only been a small reduction in total waste
- there was one year (2006) where total waste went up
- the rate of increase of percentage recycled is slowing down
- no information on materials reused
- no information on waste from factories / industry

*max 3 marks for a one sided argument*

*allow as reason against if clear*

*allow still more than half or 56.8% of waste (not recycled).*

4

(c) (i) any **two** from:

- reduce biodiversity **or** extinction
- change in migration patterns
- change in species distribution
- change in climate

*ignore rise in sea levels*

*ignore temperature change*

*accept correct examples of climate change e.g. storms, flooding, drought*

*references to weather changing is insufficient  
allow ice caps melting or habitat destruction.*

2

(ii) any **one** from:

- absorbed by oceans / ponds / lakes
- peat bogs

*allow used for skeletons / shells of sea creatures  
allow in fossil fuels / limestone.*

1

[11]

- M4.**
- (a) any **two** from:
- (volume of) peat compost has been steady and then declined **or** volume of peat compost has declined since 2005  
*allow 2007 instead of 2005*
  - (volume of) peat-free compost has increased (since 1999)
  - (volume of) peat is higher than peat-free until 2005, then peat-free compost is higher (than peat)  
*allow 2007*
  - total volume of peat and peat-free compost has increased.
- 2
- (b) increases carbon dioxide (in the atmosphere)  
*ignore methane*
- 1
- (c) any **one** from:
- reduces biodiversity
  - destruction of habitats
  - disruption of food chains.
- 1
- [4]**