

Q1.

(a)

	1960 – 1977	1977 – 2003	2003 – 2015	
trend in carbon dioxide concentration		increasing	increasing	1
trend in air temperature	decreasing	increasing	constant / decreasing	1

allow synonyms e.g. level / goes up / goes down

(b) traps heat / energy or (long-wavelength / IR) radiation

do not accept light / UV

or

less loss of heat

allow stops (some) heat escaping

do not accept stops all heat escaping

or

insulates

ignore greenhouse effect

ignore reference to ozone layer

1

(c) **Level 2:** Some logically linked reasons are given. There may also be a simple judgement.

3–4

Level 1: Relevant points are made. They are not logically linked.

1–2

No relevant content

0

Indicative content**for the theory:**

- (overall increased CO₂ parallels) overall increased temperature (e.g. by 0.4 (°C))
- CO₂ traps (long-wave) radiation / IR / heat

against the theory:

- in some years (e.g. 1960–1977) temperature falls (while CO₂ is rising)
- many (large and small) erratic rises and falls in temperature
- overall correlation does not necessarily mean a causal link
- other (unknown) factors may be involved in temperature change

to access level 2 there must be evidence both for and against the theory **and** use of data from the graph

(d) burning of (fossil) fuels

allow e.g. coal / oil / gas

allow driving cars

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- allow any activity which leads to burning fuels –
e.g. using central heating*
- ignore power stations unqualified*
- ignore burning / fires unqualified*
- ignore deforestation*
- 1
- (e) photosynthesis
- allow full description or full equation*
- allow a symbol equation which is not balanced*
- 1
- (f) any **two** from:
- (some) plants grow faster / higher yield
 - loss of habitat
 - migration **or** change in distribution*
 - extinction*
- *if neither is given allow alters biodiversity for 1 mark*
- allow (in terms of extinction) death due to e.g. lack of water / food or increased disease*
- ignore death unqualified*
- 2
- allow points made using examples*
- [11]

Q2.

- (a) any **two** from:
- sprinkled through air
 - air spaces between stones
 - thin layer over stones (for efficient diffusion)
 - slow flow (for efficient diffusion)
- 2
- (b) green algae
- 1
- (c) (large / small) protist
- 1
- (d) **Level 2 (3-4 marks):**
Scientifically relevant facts, events or processes are identified and given in detail to form an accurate account.
- Level 1 (1-2 marks):**
Facts, events or processes are identified and simply stated but their relevance is not clear.
- No relevant content (0 marks)
- Indicative content**
- digestion:**
- (external) enzymes released
 - role of enzymes – e.g. amylase / protease / lipase



- substrates & products – e.g. starch → sugar / protein → amino acids / fat → fatty acids

absorption:

- by diffusion / active transport

deamination:

- amino acids → ammonia / ammonium ions

release of other ions:

- e.g. phosphate / nitrate / magnesium

respiration:

- produces carbon dioxide (+ water)
or
equation is given
- release of energy allows other processes to take place e.g. active transport

[8]**Q3.**

- (a) (140 + 240 + 380 + 450 =) 1210

1

- (b) the local people decided to farm cattle

1

a company starts growing plants for biofuels

1

- (c) carbon dioxide

in this order only

1

photosynthesis

1

- (d) animals and birds migrate because there is less food

1

more habitats are destroyed

1

- (e) any **one** from:

- breeding programmes (for endangered species)
- regeneration (programmes)
- reintroduction of field margins / hedgerows
- awareness raising with politicians / public
- recycling

1

[8]**Q4.**

- (a) methane is produced

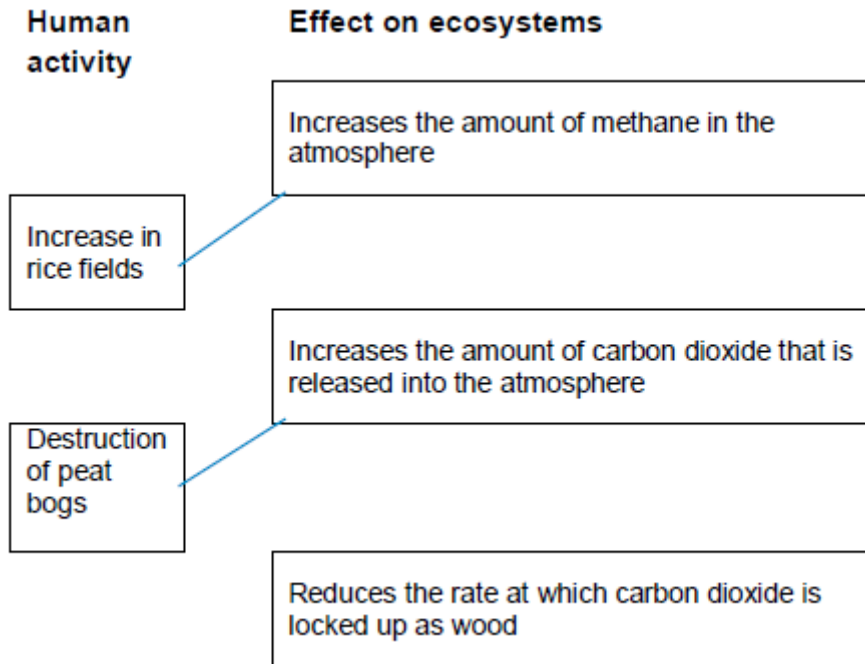
ignore bad smell

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

Q5.



(a)

extra lines from left cancels mark

2

(b) (i)

any **two** from:

- (to provide land) for farming / agriculture
- (to provide land) for quarrying
- (to provide land) for building
- to provide wood for building materials
- to provide fuel
- to provide paper

2

(ii)

any **two** from:

- changes in earth's climate, ie droughts, flooding, hurricanes
ignore temperature rise
allow ice caps melt
- rise in sea levels
- reduce biodiversity
- change in migration patterns
- may change distribution of species
ignore acid rain and the ozone layer and forest fires

2

[6]

Q6.

(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:

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- (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]

Q7.

(a) (i) counts / 12

1

× 120 × 80 / × 9600

or

× area of field

1

(ii) (more) quadrats / repeats

1

placed randomly

ignore method of achieving randomness

1

(b) (i) any **three** from:

- temperature / warmth / heat
- water / rain
- minerals / ions / salts (in soil)
allow nutrients / fertiliser / soil fertility
ignore food
- pH (of soil)
- trampling
- herbivores
ignore predators
- competition (with other species)
- pollution qualified e.g. SO₂ / herbicide
- wind (related to seed dispersal).
ignore space / oxygen / CO₂ / soil unqualified

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 <i>do not allow germs / viruses</i>	1
		(aerobic) <u>respiration</u> (by microbes) uses O ₂ <i>do not allow anaerobic</i>	1
	(ii)	sewage / toxic chemicals / correct named example eg metals / bleach / disinfectant / detergent etc <i>allow suitable named examples eg metals such as Pb / Zn / Cr / oil / SO₂ / acid rain / pesticides / litter</i> <i>ignore chemicals unqualified</i> <i>ignore waste unqualified</i> <i>ignore human waste / domestic waste / industrial waste unqualified</i>	1
(d)	(i)	2	1
	(ii)	more food <i>allow other sensible suggestion eg more species colonise from tributary streams after forest</i>	1
	(iii)	number of stonefly species decreases (from A to B / B to C / A to C) as more pollution enters river / less oxygen <i>allow fewer species in more polluted water</i> <i>ignore none are found at site C</i>	1

[19]

Q8.

- (a) any **one** from:
- increased pollution
 - dumping waste
- allow described consequence e.g. vermin*
accept (increased) landfill



- accept (increased) fly tipping.*
- 1
- (b) (i) (mass of SO₂) decreases
- 1
- and then levels off / plateaus
- 1
- (ii) 2008
- clear evidence of calculating 700 (000) = 1 mark*
- 2
- (iii) any **one** from:
- acid rain
 - erosion of statues / buildings
 - destruction of habitats
 - reduction in biodiversity
 - damage to lichen
 - breathing problems
- ignore reference to ozone layer*
- allow damage to plants.*
- 1
- (c) Carbon dioxide being absorbed in oceans and lakes
- 1
- Photosynthesis by trees
- 1
- [8]
- Q9.**
- (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]

Q10.

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- (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

Q11.

- (a) (i) correct bar heights
three correct 2 marks
two correct 1 mark
one or none correct 0 marks
ignore width 2
- (ii) (Stream Y)
 has many sludge worms / bloodworms
or
 has no mayflies / caddis or few shrimp
allow 1 mark if invertebrate not named but correct association given 1
- which indicate medium or high pollution 1
- (b) (i) suspended solids increase (as a result of sewage overflow) 1
- then decrease downstream / return to original levels 1
- oxygen levels decrease (after sewage overflow) 1
- and then rise again 1
- (ii) any **three** from:
 - mayflies decrease (to zero) near overflow
accept 'have died out'
 - because oxygen is low **or** mayflies have high oxygen demand
 - mayflies repopulate / increase as oxygen increases again
 - can't be sure if dissolved oxygen or suspended solids is the cause 3
- (c) they respire / respiration
aerobic respiration gains 2 marks 1
- this requires / uses up the oxygen 1

Q12.

- (a) it is impossible to weigh all the fish in the sea
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- 1
- (b) (i) increase / from 50 to 350 / by 300 thousand tonnes 1
- (ii) due to fishing ban / not allowed 1
- (c) (i) fishing quotas / limits 1
- changes to net size 1
- (ii) yes, biomass increases 1
- use of figures from graph eg approx 4- times **or** (was effective at first)
but numbers decline again after 2004
must use two comparative figures for 2nd marking point 1
- (iii) so that breeding continues 1
- allow prevent extinction / limit impact of fishing on food chain / web*
- (iv) 95% 2
- correct answer gains 2 marks*
2000-100=1900 award 1 mark
- (d) any **four** from:
- increase in sea / water temperature
accept ref to lower sea / water temp if shift in Gulf Stream is referred to
 - changes in migration patterns / distribution of species
 - more eggs may survive (up to 19 °C) and could lead to an increase in herring pop
 - reduction in herring pop (because eggs die if >19 °C)
accept change in other populations of fish which are alternative prey for cod
 - (appropriate) change in cod population as a result
- 4
- [14]**

Q13.

- (a) (i) 10 1
- (ii) any **three** from:
- both increase with distance
 - more spp on walls than on trees
 - no lichen spp on trees for first 1 km from city



- more steady / less erratic increase on trees than walls (or converse)
 - rate of increase increases with distance
- 3
- (b) SO₂ decreases with distance from centre
accept converse
Ignore pollution
- 1
- high SO₂ reduces survival or kills lichen
accept converse
- 1
- (c) (i) any **three** from:
- (line) transect
 - quadrat / reference to specific area
 - count number of lichens or coverage on trees
 - at regular intervals / set distances
- 3
- (ii) (more) Xanthoria nearest road
allow 'nitrogen-loving' for Xanthoria
- 1
- (more) Usnea further from the road
allow 'nitrogen-sensitive' for Usnea
- 1
- because most nitrogen oxide from vehicles (near road)
- or**
- because nitrogen oxide levels will be falling / less further away (from road)
accept converse
- 1
- [12]**
- Q14.**
- (a) decrease in photosynthesis (as fewer trees) causes less removal of CO₂
accept forest cleared for livestock which respire and give out CO₂
ignore 'Carbon sink'
- 1
- burning / combustion releases CO₂
- 1
- decay of wood (by microorganisms) releases CO₂
- 1
- (b) any **two** from:
- loss of habitat / shelter
- For more help, please visit our website www.exampaperspractice.co.uk



- loss of food source
- smaller populations more vulnerable / less likely to survive
- fewer plant species due to clearing

2

(c) (i) removing carbon dioxide from the air

1

(ii) any **one** from:

- growth of plants (to trap CO₂ in photosynthesis)
allow afforestation
- CCS (carbon capture and storage)
- separate / store CO₂ from waste gases in industry
- make new peat bogs
- absorbed / dissolved in oceans / lakes / ponds
- used as calcium carbonate to form shells / bones

1

[7]

Q15.

(a) (i) 76.0 / 76

correct answer with or without working gains 2 marks

allow 76.04 for 2 marks

allow 76.04 with extra decimal places eg 76.042 for 1 mark

$$\begin{array}{r} 465 \\ \hline 611.5 \end{array} \text{ for 1 mark}$$

2

(ii) mass of fish declines (until 2008)

ignore use of numbers

allow number of fish decline (until 2008)

1

(due to an) increase in fishing / overfishing

1

and then rises (until 2010)

1

(which could be due to) quotas / net restrictions working

allow any reasonable suggestion, such as countries swapping quotas or restrictions on fishing during breeding seasons

ignore less fishing

*if no other marks awarded allow 1 mark for a decrease in mass **and** an increase in mass if answer relates to sustainable fishing*

1

(iii) (this is due to) public awareness / demand

allow legislation / rules

1



(b) fishing quotas / bans	1
(small) net / mesh size <i>if size of net is stated then it must be smaller</i> <i>if size of mesh is stated then it must be larger</i>	1
(c) (fish) cannot move freely / as much	1
(therefore) less <u>energy</u> loss from the fish <i>do not allow 'no energy is lost'</i> <i>ignore references to less heat loss through controlling body temperature</i> <i>ignore references to respiration</i>	1
(there is) more food available / better quality food / fed more often <i>accept 'high-protein food (for making cells)'</i>	1
(so) there is more energy for growth or (more food) is converted to biomass	1
	[13]

Q16.

Marks awarded for this answer will be determined by the Quality of Written Communication (QWC) as well as the standard of the scientific response. Examiners should also apply a 'best-fit' approach to the marking.

0 marks

No relevant content

Level 1 (1 – 2 marks)

There is at least one reason for deforestation

or

an attempt at a description of at least one way deforestation is affecting the atmosphere.

Level 2 (3 – 4 marks)

There is at least one reason for deforestation

and

a description of the way deforestation is affecting one gas in the atmosphere

or

the process that causes an effect.

Level 3 (5 – 6 marks)

There are reasons for deforestation

and

a clear description of the way deforestation is affecting one gas in the atmosphere

and

the process that causes this.

examples of the points made in the response

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Reasons for deforestation

- timber for construction / furniture / boat building / paper production
- growing plants for biofuels for motor fuel / aviation / lawnmowers
- use of wood as a fuel
- land for building or agriculture to provide food, such as rice fields and cattle ranching

Effects of deforestation

- increase in carbon dioxide in atmosphere
due to burning
due to activities of microbes
less carbon dioxide taken in / locked up (by trees)
less photosynthesis
- increase in methane in atmosphere
due to rice production / cattle

extra information*ignore references to oxygen**accept explanations of the effect of water (vapour)***[6]****Q17.**

(a) genes

1

chromosomes

1

(b) (i) higher yield

1

less use of pesticides

1

(ii) any **two** from:

- uncertain about effects on health
- fewer bees
- might breed with wild plant
- seeds only from one manufacturer

2

[6]**Q18.**(a) any **two** from:*ignore CO₂ release unqualified*

- burning



- activity of microbes / microbial respiration
- less photosynthesis

or

trees take in CO₂

*do **not** accept CO₂ taken in for respiration*

or

less CO₂ locked up in wood

- CO₂ given off by clearing machinery

2

- (b) (i) range of different species

accept idea of variety of organisms or plants or animals

1

- (ii) any **two** from:

- organisms may produce substances useful to humans
*do **not** accept if food is only example*
- duty to preserve for future generations
- effect on other organisms, eg food chain effects
ignore effect on human food supply
- loss of environmental indicators

2

[5]

Q19.

- (a) circulating / mixing / described **or** temperature maintenance

1

supply oxygen

or for aerobic conditions

or for faster respiration

*do **not** allow oxygen for anaerobic respiration*

1

- (b) energy supply / fuel / use in respiration

*do **not** allow just food / growth*

ignore reference to aerobic / anaerobic

or material for growth / to make mycoprotein

1

- (c) respiration

allow exothermic reaction

allow catabolism

ignore metabolism

ignore aerobic / anaerobic

1

(d) (i) any **one** from:

- compete (with *Fusarium*) for food / oxygen **or** reduce yield of *Fusarium*
- make toxic waste products or they might cause disease / pathogenic **or** harmful to people / to *Fusarium*
do not allow harmful unqualified

1

(ii) steam / heat treat / sterilise fermenter (before use)
not just clean

or

steam / heat treat / sterilise
glucose / minerals / nutrients / water (before use)

or

filter / sterilise air intake

or

check there are no leaks

allow sterilisation unqualified not just use pure glucose

1

(e) any **three** from:

- beef is best or beef is better than mycoprotein
- mycoprotein mainly better than wheat
- more phenylalanine in wheat than in mycoprotein
allow equivalent numerical statements
- but no information given on other amino acids / costs / foods

3

overall conclusion:

statement is incorrect because

either

it would be the best source for vegetarians

or

for given amino acids, beef is the best source

or

three foods provide insufficient data to draw a valid conclusion

1

[10]

Q20.

(a) any **two** from:

- fewer trees to take in carbon dioxide for photosynthesis
- decomposers / microorganisms respire (as they decay debris) releasing carbon dioxide

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- burning of wood releases carbon dioxide
allow carbon dioxide released by burning fossil fuels in vehicles / factories

2

- (b) Marks awarded for this answer will be determined by the Quality of Communication (QC) as well as the standard of the scientific response. Examiners should also refer to the information on page 5, and apply a 'best – fit' approach to the marking.

0 marks

No relevant content.

Level 1 (1 – 2 marks)

There is a brief description of some steps in the process but the order is not clear with little biological vocabulary used.

Level 2 (3 – 4 marks)

There is a reasonably clear description of the process involving many of the steps and using some biological vocabulary.

Level 3 (5 – 6 marks)

There is a clear, logical and detailed scientific description of the process using appropriate biological vocabulary.

examples of biology points made in the response:

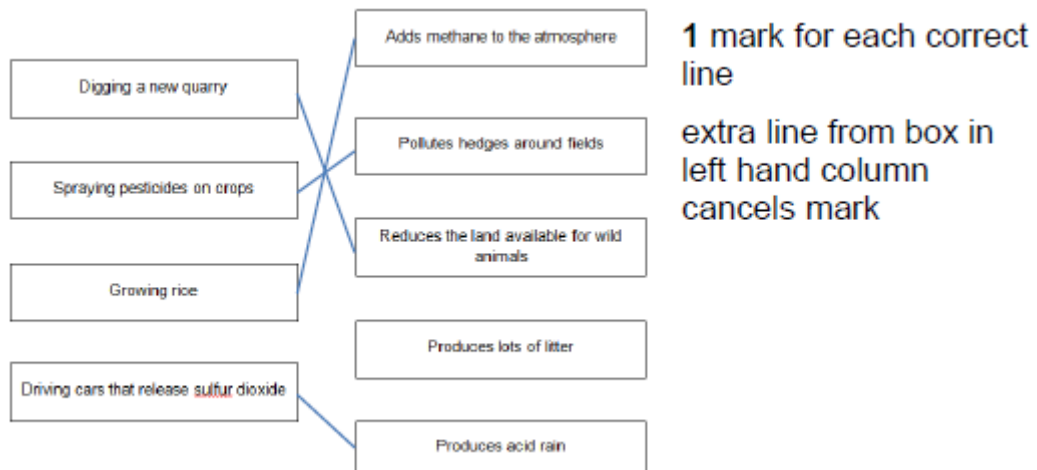
- this contains mineral ions (and organic matter)
- this increases growth of algae / water plants
- the plants / algae (underneath) die
- due to lack of light / photosynthesis / space
- decomposers / microorganisms feed on decaying matter **or** multiply rapidly
- the respiration of decomposers uses up all the oxygen
- so invertebrates die due to lack of oxygen
- this is called eutrophication

6

[8]

Q21.

(a)



4



(b) any **two** from:

- climate change
ignore 'Earth warmer'
- more extreme weather / changes to weather (patterns) / described
- rise in sea level
- melting of ice caps
- reduced biodiversity
- changes to migration patterns
- changes in distribution of species
accept faster plant growth / tropical species can be grown in UK
accept tropical diseases / example spread to temperate regions

2

[6]

Q22.

(a) (i) kills / gets rid of / reduces methane bacteria
allow kills / gets rid of / reduces bad bacteria
ignore acts like antibiotic

1

(ii) less food converted to methane
allow can keep more cattle without further environmental damage
ignore energy

1

more growth / meat / muscle / milk produced / more profit / fatter animals
ignore references to bacteria and disease

1

(b) absorbs energy / heat radiated by Earth
allow absorbs / traps energy / heat / from Earth
*do **not** allow absorbs energy / heat from Sun*

1

some energy / heat reradiated
ignore reflected
*do **not** allow reradiates energy / heat from Sun*

1

leading to global warming / enhanced greenhouse effect
accept effects of global warming eg melting ice caps
accept methane is a greenhouse gas



ignore references to ozone

1

[6]

Q23.

(a) 60

correct answer gains 2 marks

if answer incorrect evidence of using 40 gains 1 mark

2

(b) any **two** from

ignore temperature rise / global warming

- climate change / described e.g. hotter summers / drought / seasons change
- rise in sea levels / flooding
allow other environmental effects
- glacier melting / ice caps melting
- forest fires
- habitat destruction
- effect on organisms
- eg extinction / migration

2

[4]

Q24.

(a) 860

correct answer gains 2 marks

if answer incorrect evidence of $(6100 - 1800) \div 5$

or $4300 \div 5$

or $(900 + 600 + 1000 + 700 + 1100) \div 5$ gains 1 mark

allow ecf from 1 incorrect graph reading

2

(b)

ignore references to oxygen / sulfur dioxide / nitrogen oxides / acid rain
ignore global warming

Effects of deforestation

deforestation increases the amount of carbon dioxide in the atmosphere

award this point only if linked to deforestation

1

any **two** from:

- due to less photosynthesis **or** less carbon dioxide taken in
or carbon dioxide not locked up in (forest) trees



- due to burning of forest / from machinery
- due to activity of microorganisms / decay

2

Effects of growing palm for fuel

carbon dioxide released when palm oil used as fuel

1

(eventually) CO₂ intake and output might balance out **or** burning palm oil carbon neutral

accept less carbon dioxide than from burning fossil fuels

1

[7]**Q25.**

- (a) (i) carbon dioxide
- (ii) sulfur dioxide
- (b) (i) reduces land available for animals and plants
- (ii) metals
- (c) (i) pesticide
- (ii) kill other animals

1

1

1

1

1

1

[6]**Q26.**

- (a) warmer / dryer
allow greenhouse effect / global warming
ignore wind
- (b) (i) genes / alleles / chromosomes / DNA / genetic material / genetics
allow inheritance
allow nutrition / food / metabolism / growth rate
ignore environment
- (ii) natural selection / evolution
allow survival of the fittest

1

1

1

[3]**Q27.**

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- (a) any **two** from:
- shorter distance between samples
ignore repeat investigation / measurements
 - sample to greater height
 - specify the size of each site
ignore longer transect
- (b) (i) Parmelia
- (ii) Evernia
- (c) any **two** from:
- Lecanora does not extend over whole range of transect / does not grow everywhere / does not grow in town centre / does not grow in countryside
 - Lecanora grows in a range of sulfur dioxide concentrations **or** Lecanora only grows in limited range of sulfur dioxide concentrations **or** Lecanora lives over large range of sulfur dioxide concentrations
 - other factors eg different pollutant might also influence growth of Lecanora
 - sulfur dioxide / pollutant concentration was not measured
ignore Lecanora does not give accurate measure of sulfur dioxide concentration
 - amount of Lecanora not measured

1

1

1

2

[5]

Q28.

- (a) 5
- (b) any **one** from:
- allow in either section*
- more light
allow more sun / sunnier
 - warm(er) / hot
 - more water / lot of rain
- increased / more photosynthesis
allow in either section
allow more biomass / carbohydrate / named (made)
*do **not** allow food*

1

1



allow enzymes / metabolism faster

NB for 2 marks this must be linked to heat

to gain 2 marks more / increased must be mentioned at least once

1

- (c) less pollution / named pollutant eg carbon dioxide / 'fumes' / emissions

allow examples of effect of less pollution

eg less global warming / less acid rain

allow any relevant environmental effect

eg imported diseases

1

less fuel used / less transport / named transport

ignore 'less distance' / importing

allow 'less distance travelled' / 'less travel'

allow smaller carbon footprint once only for either mark

1

[5]

Q29.

- (a) (i) 40

accept -40 or +40

1

- (ii) **Step 1** 92

1

Step 2 18

1

Step 3 74

*correct subtraction of answer in **step 2** from answer in **step 1** gains 1 mark*

correct answer 74 with no working gains 3 marks

ignore sign

1

- (b) (i) both animals and plants

1

- (ii) microorganisms

1

- (iii) carbon dioxide

1

[7]

Q30.

- (a) fuel / houses / paper

allow any object made from wood

1



- farming / agriculture / replanting
allow roads / homes / factories 1
- carbon dioxide / greenhouse gas / pollution **or** relative named pollutant 1
- warming / temperature increase 1
- (b) (i) none of species left / died out 1
- (ii) may have products useful to humans / examples
allow preserve for future generations or 'still there to look at'
allow affect food chains / cycles or extinction of other species
allow non human reasons eg loss of habitat
ignore environmental effects 1

[6]**Q31.**

- (a) any **one** from:
- increase / give light
 - increase temperature / make warmer
- award marks if the method by which these could be done is given
eg leave lights on all night **or** use a heater
- increase / give CO₂
 - add fertiliser / nutrients / minerals / named
allow nitrogen
ignore 'food' 1
- (b) (i) any **two** from:
- cheaper
allow grow faster / more grown
 - better quality / flavour
ignore size
 - available all year
accept converse if clear that answer refers to use of British tomatoes
allow 'Fair Trade' 2
- (ii) any **two** from:

- greater distance **or** more food miles **or** more transport
- idea of more needed only once
- transport needs (more) energy / fuel
 - reference to eg greenhouse effect / global warming / pollution / CO₂ release / carbon footprint
ignore ozone

2

[5]**Q32.**

- (a) (i) (more) habitats / (greater) variety of habitats / range of food
*allow (more) places / trees for homes **or** different places to live*
allow no pesticides / herbicides / chemicals sprayed
allow more food
allow safer / can hide
allow effects of machinery

1

- (ii) any **two** from:
- building / houses / factories / etc
ignore timber / uses of wood
 - roads
 - quarrying
 - waste dumps / landfill
 - grazing

2

- (b) (i) fertilisers

1

- (ii) pesticides

1

- (iii) pesticide / herbicide / chemicals / sprays
allow river (through farmland) polluted
allow correct effect of fertilisers on river organisms

1

- (c) any **two** from

- pollution / named pollutant / combustion / cars
- dumping waste / litter
allow 'not recycling'



- raw materials used up **or** reference to quarries / mines
- chopping down trees
- building / houses / etc
- global warming

2

[8]**Q33.**(a) any **two** from: eg

- same volume of solution
do not allow same size of container
- left for same length of time
- same temperature
- same oxygen
- same pH
- same number of invertebrates / animals
do not allow same number of species
- same age / stage of invertebrates / animals

2

(b) line of best fit / curve / point to point drawn going through 240-260 and 25

1

correct interpolation to X axis

if no work on graph allow 250

1

(c) (i) (C)

50% killed at lowest / low copper concentration

ignore least survivors

1

(ii) any **two** from:

- involves counting
easy to count gains 2 marks
- easy to do
- invertebrates more sensitive
- needs less / no apparatus
ignore more reliable / accurate

2

Q34.

(a) 3.2

award **both** marks for correct answer irrespective of working
if answer incorrect

$$(55 + 55 + 1.2 + 5) - (110 + 3)$$

or

$$116.2 - 113$$

or

$$(55 + 55 + 1.2 + 5 + 90) - (110 + 93) \text{ gains 1 mark}$$

2

(b) any **one** from:

- less carbon dioxide taken in by trees
*ignore carbon dioxide released by trees **or** trees store carbon dioxide*
- less photosynthesis
- burning trees releases carbon dioxide
- decay releases carbon dioxide

1

[3]

Q35.(i) customers concerned with the environment / green issues (will be attracted) owtte
allow idea of helping the world

1

(ii) reduces transport of food

1

less carbon dioxide / greenhouse gas / emissions / harmful gases / lower carbon footprint (from transport)

*allow less fuel used**ignore pollution unqualified*

1

[3]

Q1.(a) any **two** from:*ignore CO₂ release unqualified*

- burning
- activity of microbes / microbial respiration
- less photosynthesis
*do **not** accept CO₂ taken in for respiration*

ortrees take in CO₂**or**less CO₂ locked up in wood

- CO₂ given off by clearing machinery

2

(b) (i) range of different species

accept idea of variety of organisms or plants or animals

1

(ii) any **one** from:

- organisms may produce substances useful to humans
*do **not** accept if food is only example*
- duty to preserve for future generations
- effect on other organisms e.g. food chain effects
ignore effect on human food supply
- loss of environmental indicators

1

[4]**Q2.**

(a) burning / combustion fossil fuels / burning wood

*accept named fossil fuel**accept driving cars / any vehicles**do **not** accept burning / combustion unqualified**do **not** accept factories**ignore factory chimneys unqualified**ignore respiration*

1

deforestation

1



- (b) (i) (overall) increase
1
- fluctuations
highs are higher and
lows are not as low = 2 marks
1
- (ii) no – could be due to some other factor **or**
could be coincidence **or** fluctuations \pm
same size as the overall rise or large
fluctuations or sometimes when CO₂ rises temperature doesn't
1
- (c) any **one** biotic **or** abiotic effect eg:
*do **not** credit just "climate / weather change"*
allow extreme climate / weather change
- changes in rainfall
accept drought, desert formation
- ice-caps melting / rise in sea level
accept flooding
- changed pattern of winds
- changed pattern of migration
- changed species survival
- changed growth
1

[6]

Q3.

- (a) (i) increases
1
- (ii) decreases
1
- (b) any **two** from:
- competition for water
 - competition for ions / minerals / salts / nutrients
accept correct named example
*do **not** accept food*
*do **not** accept all*
 - competition for light
2
- (c) kills / harms other / named organisms
1

Q4.

- (a) burning fossil fuels / named example
accept driving cars / lorries etc burning fuels in power stations
ignore combustion unqualified
*do **not** accept catalytic converter on its own **or** emissions from power stations* 1
- (b) (i) pollutants / smoke breathed in 1
- (ii) SO₂ and deaths rise (and fall) at same times **or**
 SO₂ and deaths parallel each other / show same pattern 1
- (iii) no – could be due to some other factor / pollutant /
 to smoke **or** correlation not precise / described
explanations must come to a conclusion
named examples must be plausible allow 'coincidence' 1

[4]

Q5.

- (a) (i) carbon dioxide
accept other positive indications 1
- (ii) methane
accept other positive indications 1
- (b) increase
accept other positive indications 1
- (c) any **three** from:
 building
accept houses / airports / roads / factories
 farming / removing hedgerows / fire
*do **not** accept pesticides, fertilisers etc*
 quarrying / mining
 industry
accept release of toxic chemicals / named eg
*accept acid rain / global warming only if linked to production by human activity do **not** accept just 'pollution'*



drainage of marshland

dam construction / flooding land

dumping waste

do not accept fly tipping, litter

3

[6]

Q6.

(a) burning fossil fuels / coal / gas / oil

accept driving vehicles / eg cars

accept coal-fired power station

accept car emissions

ignore combustion unqualified

do not accept power station unqualified

do not accept using fossil fuels

1

(b) (i) (SO₂) makes it acidic / makes acid rain / lowers pH

1

(ii) any **one** from:

(SO₂) kills leaves reduces number of leaves reduces leaf area

or smaller leaves causes fewer leaves to grow

ignore correct extras, eg

withered, yellow etc

1

(c) any **two** from:

(fewer leaves / less leaf S.A) so less photosynthesis

less food / less sugar / less starch supplied (to roots / to stems)

(SO₂) lowers pH of soil / makes soil acidic

ions (/minerals / salts / nutrients) less available (to plants)

accept don't get enough nutrients

2

[5]

Q7.

(a) (i) building

or

wood/timber/furniture

or

paper

or

packaging

or

fuel/burning



- do not accept 'logs' by itself*
- 1
- (ii) farming/agriculture
or
building
or
roads
- 1
- (iii) increased CO₂
- 1
- (b) (i) trees photosynthesise/less photosynthesis takes place (and)
accept burning trees (1)
- 1
- trees/photosynthesis uses carbon dioxide
releases CO₂ (1)
- 1
- lets in heat/energy
do not accept sunshine
- 1
- prevents it escaping (from the atmosphere)
or
being reflected/retransmitted into space
- 1
- (ii) global warming
accept increased 'el nino'
- or**
a named effect of global warming such as polar ice cap melt,
climatic change, increased temperature/sea level rising
accept warmer weather
- 1

[8]**Q8.**

- (a) award two marks for correct plotting
deduct 1 mark for each error, minimum mark 0
- 2
- (b) 14 – 16
transfer error allowed
- 1
- (c) lichen **types** increase with distance
accept converse
- 1
- (d) any two from:



more bicycles used	
smoke free zones	
out of town shopping	
	2
park and ride/other schemes to keep cars from city centres e.g. pedestrian areas	
increased use of public transport	
less/improvements in factories/power stations	
improved technology in cars	
(e) SO ₂ /NO ₂ /CO ₂ (or words)	
or	
oxides of nitrogen dissolves/combines/reacts (in water)	
<i>do not accept mixes</i>	1
makes an (weak) acid	
<i>n.b. acid as an adjective not a noun</i>	1
any one from:	
acidification of water/soil	
damage to trees/plants	
	1
damage/dissolve/erosion of cement or	
marble/limestone or metals or	
buildings or statues	
<i>accept corrodes</i>	
kills fish	
loss of leaves	
	1

[10]

Q9.

(a) fuels	1
cars	1
sulphur	1
dissolve	1



water

1

kill

1

plants

1

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

acid rain **or** specific effects of acid rain up to a maximum of **2**

global warming **or** consequences of global warming up to a maximum of **2**

increased greenhouse effect

2

(ii) deforestation **or** less plants

or

volcanoes

or

car (internal combustion engines)

or

types of domestic fires **or** central heating

or

burning rubbish **or** wood

*accept inversion effects in African
or volcanic lakes*

1

[10]

Q10.

(a) 21 600

no marks for working

1

(b) soil not held in by tree roots

1

water falls on the soil or wind reaches soil
or trees normally intercept

or

soil washed away or soil blown away

1

(c) (i) less carbon dioxide removed
or trees (normal) remove CO₂
ignore reference to O₂

1

more carbon dioxide added by burning
(wood)



or (more) CO₂ from decomposition

1

(carbon dioxide) stops (radiant) heat escaping from earth

or less heat escapes

1

(ii) any **two** from:

changed patterns of rainfall **or** wind or causes drought

NOT just 'climate change'

accept increased evaporation

polar ice caps melting **or** sea levels rise

or desert formation **or** loss of habitat

changed plant growth **or** changed distribution of species

or species become extinct

accept named example

accept killing and dying of species

2

(iii) (more) photosynthesis (because more trees)

1

(more) carbon dioxide removed from atmosphere **or** trees remove CO₂

*ignore references to transpiration **or** water vapour*

(as a minimum photosynthesis uses CO₂ = 2 marks)

ignore reference to oxygen

1

[10]**Q11.**

(a) increases in human population;

gains 1 mark

2 of:

have led to need for land to be used for housing;

and for industry; farming; transport; leisure

each for 1 mark

3

(b) 4 of e.g.

reduced number of habitats;

possible reduction in number of species;

more waste/pollution;

examples of pollution;

one effect of this waste;

reference to herbicides/pesticides;

references to excess fertilisers;

reference to food chain effects

each for 1 mark

4

[7]

Q12.

- (a) increased human population
increased standard of living
each for 1 mark 2
- (b) nutrients absorbed by plants not replaced
each for 1 mark 2
- (c) increased release of carbon dioxide into atmosphere when trees are burned
reduced rate of carbon dioxide removal from atmosphere
increased carbon dioxide absorbs more of energy radiated by Earth
global rise in temperature
each for 1 mark 4

[8]

Q13.

e.g.
waste gases/air pollution harms living organisms
dumped waste can make land unfit to live on/
drainage pollutes water/harms organisms
for 1 mark each
(if no marks can allow – pollution harms organisms = 1)

[2]

Q14.

Cogently argued based on biological principles, for **and**
against introduction of caterpillar
maximum of 4 pros e.g.
fewer chemicals used therefore less expense
less chemical damage to other plants
consequent benefits to food chains
fewer farm animals poisoned therefore more economic
countryside more varied therefore more attractive to tourists
tourists bring economic advantages
greater variety of habitats therefore greater variety of species
any 4 for 1 mark each 4

cons e.g.
danger to livelihoods if crops destroyed by caterpillar
relatively low chance of success since only one third of schemes
effective world-wide
unlikely to be natural predators therefore ecological balance affected
any 2 for 1 mark each 2



cogently argued case **gains up to 2 marks**

2

[8]**Q15.**

- (a) two thirds/66%

for 1 mark

1

- (b) 2 of:
by sewage
by chemicals fertilizers

any 2 for 1 mark each

2

[3]**Q16.**

- (i) fewer hedges
marsh drained
less woodland/trees
more farm buildings

any 2 for 1 mark each

2

- (ii) fewer
e.g. fewer habitats

for 1 mark each

2

[4]**Q17.**

- (a) 15%

for 2 marks

2

- (b) combustion,
deforestation

for 1 mark each

2

- (c) rice fields

for 1 mark

1

- (d) greenhouse gases absorb energy,
which is radiated by Earth,
keeping the Earth warmer than it would otherwise be

for 1 mark each

		3	
			[8]
Q18.			
(a)	sulphur dioxide sewage pesticides <i>for 1 mark each</i>	3	
(b)	<i>idea of reduced numbers / loss of habitat (home) / killed or damaged by pollution</i> <i>for 1 mark</i>	1	
			[4]
Q19.			
(a)	e.g. timber agriculture roads / urban development / buildings <i>any two for 1 mark each</i>	2	
(b)	<i>ideas that (accept reverse arguments)</i> increased carbon dioxide content since less during photosynthesis and locked-up as wood burning increases carbon dioxide content increased activity of microbes increases carbon dioxide content oxygen content reduced water vapour content reduced <i>any five for 1 mark each</i>	5	
			[7]
Q20.			
(a)	(i)	200 kJ <i>for 1 mark</i>	1
	(ii)	2 <i>gains 2 marks</i> <i>(if answer incorrect, 20 / 1000 × 100 gains 1 mark)</i>	2
(b)	<i>ideas that</i> energy lost by animal (pig / cattle) / extra stage / extra trophic level in waste materials e.g. in muscular activity / movement in keeping body temperature higher than surroundings / lost as heat <i>any three for 1 mark each</i> <i>references to respiration regarded as neutral</i>	3	



- (c) *ideas that*
controlling (high) temperature of surroundings / keeping indoors / insulating
reduces energy transferred from animal as heat / animal uses body heat to maintain
temperature restricting movement (e.g. caging or keeping in darkness)
reduces muscular contraction / muscular activity

each for 1 mark

accept respiration as explanation once only if neither

explanation point has received credit

reject give more food / different food

4

[10]

Q21.

- (a) fuels
smoke / sulphur dioxide
smoke / sulphur dioxide
pesticide / fertiliser
pesticide / fertiliser

for 1 mark each

5

- (b) produces acid (rain)
for 1 mark

which may damage trees (reject plants unqualified)

which may make lakes / rivers too acid for animals or plants

which may affect stonework / metals / paint

(ozone damage or global warming disqualifies the effect mark)

any one for 1 mark

2

[7]

Q22.

pros e.g.:

gum trees survive therefore less soil erosion
therefore food webs not disrupted
if no culling, whole Koala population may die
easier to cull because Koalas are difficult to catch

cons e.g.:

Koala's 'right to life' / ethical issue
better to transfer to reserves on mainland than kill
could use tranquillisers to catch without killing
could allow population to stabilise naturally

max 4 of the above; max 3 pros or cons.

[4]

Q23.



- (a) habitats destroyed
*accept idea that the places to live **or** food **or** minerals are reduced **or** less shelter*
1
- (b) any **two** from
fertilisers / named fertilisers
accept sewage / lime
pesticides
herbicides
2

[3]

Q24.

- (a) any **two** from
- deforestation reduces carbon dioxide removal from the atmosphere
accept less photosynthesis for reduces carbon dioxide removal
accept cutting down trees for deforestation
ignore cutting down plants
accept there are less trees to remove carbon dioxide
 - burning wood / trees (releases carbon dioxide)
 - microbes decay / decompose wood / trees (releasing carbon dioxide)
2
- (b) may cause a rise in sea level
accept may cause polar / ice caps to melt / flooding
*do **not** accept global warming **or** greenhouse effect **or** erosion*
1
- may cause changes in the Earth's climate
*accept causes changes in the weather **or** named, comparative **type** of weather **or** drought*
accept seasonal changes
1
- (c) methane
*accept natural gas **or** CH₄*
1

[5]

Q25.

- (a) 3060 (kJ)
1



- (b) (i) 22060 (kJ) 1
- (ii) photosynthesis 1
- (c) faeces / undigested food
reference to movement and respiration are neutral
urine / urea 2
*accept excretion / waste / droppings if
both of the mark points are not gained*
- (d) any **two** from 2
- control ripening
 - herbicides
 - prevent over ripening in transport
 - stimulate root growth
other growth references are not neutral
 - use in tissue culture to produce large numbers of plantlets

[7]

Q26.

- (a) any **one** from: 1
- herbicide
accept weedkiller
- pesticide
*accept insect killer
do **not** accept fertilisers*
- (b) any two from: 2
- (fossil) fuels are burned
 - sulphur dioxide is released
 - (sulphur dioxide) dissolves / reacts (in water)
accept sulphur oxides are released

[3]

Q27.

- (a) any two from:
- agriculture
*accept land to grow crops **or** graze cattle*
- buildings



roads

any 2 different uses for wood for 1
mark each

accept wood for burning (energy)
accept timber for wood

2

(b) (i) (USA has) more wealth / technology /
devices / need for electricity

1

(ii) damage done

e.g. pollutant / mining / non-renewable / deforestation

1

linked effect

*e.g. greenhouse effect / visual pollution / run out of
resources / flooding*

1

(c) (i) **Problem** – because some people did not want to pay the (landfill) tax

1

Waste dumped elsewhere

1

(ii) named example of

Reduce – such as less packaging / repairing

1

Reuse – such as glass bottles / shopping bags / ink jet cartridges

1

Recycle – such as metals, glass, paper

Mark as a whole

1

[10]

Q28.

any **three** from

building

accept building of houses, roads, power stations

quarrying

farming

'dumping' waste

[3]

Q29.



(a) any **three** from:

space

accept land, room

water

accept rain

nutrients

accept fertilisers, nitrates, minerals

*do **not** accept food*

*do **not** accept just sun*

light

carbon dioxide

3

(b) herbicides

1

[4]

Q30.

Quality of Written Communication

1 mark for correct sequencing
burning → named gas → correct
environmental problem

1

any **three** from:

coal / fossil fuel is burned

(water vapour and carbon dioxide and) sulphur dioxide formed

accept nitrogen oxides

(gases) dissolve / react in rain

accept dissolve / react in water vapour

make acid rain

damages trees

*accept harms plants **or** animals **or** damage to buildings*

makes rivers /lakes acidic

*accept carbon dioxide is a greenhouse gas / causes global
warming for 2 marks*

3

[4]

Q31.

indication that carbon dioxide emissions contribute to global warming



accept 'greenhouse effect' for global warming

1

argument for:

in terms of decreases carbon dioxide emissions because less (fuel / energy used for) transport / imports

1

argument against:

in terms of increases carbon dioxide emissions because of (fuel / energy used for) heating and lighting greenhouses

1

[3]**Q32.**

use less nitrate / fertiliser

accept use none

use a different fertiliser is neutral

prevent nitrate fertiliser run off is neutral

1

any **two** from:

explanation that with less or none the crops still grow

make more land available to grow more crops

monitoring of water

legislation

organic farming / manure

genetically modified crops

give babies bottled water

2

[3]**Q33.**

(a) carbon dioxide

1

methane

1

greenhouse effect

1

(b) coal / oil / gas / peat / petrol / paraffin

1

[4]**Q34.**



(a) 12 500

incorrect numerical answer but clear evidence of correct working e.g. 365 million \div 365 \div 80 or 3285 million \div 365 \div 720 credit with (1)

2

(b) (i) vegetation
→ (farm) animals → humans

*accept any correct variation on this theme
e.g. grass → lambs → humans*

1

(ii) any **three** linked points from

* less links in the food chain
or only one link in the food chain

* energy 'wasted' **or** 'lost' **or**
'used' at each link

* energy 'wasted' **or** 'lost' in (the
process of) respiration

* energy 'used' to maintain body
temperature

* energy 'used' by the animals in
movement

3

(c) people will eat more/greater proportion
of food from plants

*accept people will eat less/smaller proportion of food from
animals*

do not credit 'everyone will stop eating meat'

1

any **three** linked points from

these marks are independent of the 'prediction' mark

do not credit 'food from plants will become less expensive'

* meat will become more expensive

* only a limited area of land
available on the planet (for food
production **or** otherwise)

* more people means less land
available for food production
because some used for housing etc.

* land will become more expensive

* land will have to be used more
efficiently

or more people will go hungry

or people will (each) eat less

* livestock farmers will try to improve efficiency

* (leading to) growth of 'factory farming'

* demand for food will rise (total)

3

Q35.

- (a) 1960 **or** 1961 1
- (b) birth rate
accept reproductive rate 1
- (c) (i) 1963 1
- (ii) Fin go down
Sei go up
both are required for the mark to be given 1
- (d) any **one** from
- there are fewer Fin whales so Sei whales start being caught more
- Sei whales are breeding more
accept population goes up
- there are more Sei whales because there are fewer Fin whales to eat their food
to compensate for lower catches of other whales
accept argument based on predation 1

Q1.

- (a) *idea:*
more (fossil) fuel burned (do not credit simply more people/cars/industry)
deforestation = less photosynthesis
deforestation = more respiration/burning
each for 1 mark

3

- (b) *idea:*
climate change
for 1 mark
- warmer/colder/drier/wetter
food production affected/starvation
mayor ecosystems destroyed/damaged
any two for 1 mark each

6

sea level rise
for 1 mark

low land flooded
less food grown/starvation
homes/factories flooded
any two for 1 mark each

Allow
polar ice caps melt
sea water expands

[9]**Q2.**

idea that

- acid rain
- pollutes lakes/rivers and kills fish
- corrodes buildings
- kills trees and plants
- adds carbon dioxide to atmosphere
- increases greenhouse effect
- changes climate
- raises sea levels
- affects wildlife/cities/farmers



- smoke/soot makes surroundings dirtier
- other suitable examples
any three for 1 mark each

Credit any reference to pollution for 1 mark if above answers not given

Mark the first correct/incorrect answer on each line (some may be neutral) unless some lines not used

[3]

Q3.

Factor and effect needed.

idea

- killed by poachers (for tusks/ivory)
- not enough food for elephants because humans cut down trees
- not enough space because more used by people/agriculture
- food/space destroyed by humans
- killed for food

any three for 1 mark each

[3]

Q4.

ideas for

- more food produced/increased yield
- cheaper food
- bigger income for farmer (allow profit)
- less loss/damage/spoilage of crop
- allow less wasted growth (of straw due to drawing)

any three for 1 mark each

3

ideas against

- chemicals harm people (do not accept “affect flavour”)
- fertiliser costly
- fewer worms (in soil)
- weedkillers kill valued/useful wild plants
- insecticides/pesticides kill useful insects/other animals



(general idea that chemicals harm plants/animals gets only 1 of these)

- (weedkillers insecticides/pesticides/fungicides/hormones/chemicals) contaminate water
- (increased risk) pesticide resistance over production/food mountains
- possible eutrophication/nitrate in river/extra plant growth/
- explanation of eutrophication

for 1 mark each to a maximum of 4 marks

4

[7]

Q5.

- roads
- factories / industries
- airports
- railways 'Buildings' as an only answer
- housing estates / towns / cities award one mark
- farms / farming / crops
- quarries / mines
- theme parks
- play areas
- rubbish dumps

*any sensible answers which refer to land being covered
[Do not allow deforestation, pollution, golf courses, parks]
any three for 1 mark each*

[3]

Q6.

- methane is given off from rice fields
- industry / burning fossil fuels which increases CO₂ in the atmosphere
- deforestation increases CO₂ due to burning / rotting trees
- deforestation means less CO₂ used (in photosynthesis) / less carbon locked up in wood
- methane / carbon dioxide a greenhouse gas
- greenhouse gases increase Earth's temperature / cause global warming



- reduce radiated energy or 'reflect back' radiation
any five for 1 mark each
(do not credit references to cattle producing methane or to effects of global warming)

[NB

- *claims that SO₂ a greenhouse gas and/or referring to acid rain*
- *referring to ozone layer[deduct 1 mark for each]*

[5]

Q7.

- (a) carbon dioxide / methane / natural gas / North Sea gas
(credit CO₂ / CH₄)
for 1 mark

1

- (b)
- reduce energy / heat radiated by / lost by Earth (into space)
(not heat / energy trapped)
 - heat / energy radiated back to Earth
(not reflected)
 - keep the Earth warmer (than it would otherwise be)
or cause of global warming *(not greenhouse effect)*
 - causes seawater to expand
 - causes ice (caps) / glaciers to melt
 - cause a rise in sea level
 - cause changes in the Earth's climate

(credit named climatic change but not drought)

(NB. Deduct 1 mark for any reference to ozone layer)
any four for 1 mark each

4

[5]