Mark schemes

1 (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]

2 (a) 21 600

no marks for working

1

(b) soil not held in by tree <u>roots</u>

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 CO_2

ignore reference to O_2

1

more carbon dioxide added by burning (wood)

or (more) CO_2 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 CO_2

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

(as a minimum photosynthesis uses CO_2 = 2 marks)

ignore reference to oxygen

1

[10]

3

(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]

4

(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]

5 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]

6 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]

7 (a) two thirds/66%

for 1 mark

1

(b) 2 of:
by sewage
by chemicals fertilizers

any 2 for 1 mark each

2

[3]

8 (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]

9 (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]

10 (a) sulphur dioxide
sewage
pesticides

for 1 mark each

3

(b) *idea of* reduced numbers / loss of habitat (home) / killed or damaged by pollution

for 1 mark

1

[4]

11 (a) e.g.
timber
agriculture
roads / urban development / buildings

any two for 1 mark each

2

(b) *ideas that (accept reverse arguments)*
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

any five for 1 mark each

5

[7]

12 (a) (i) 200 kJ

for 1 mark

1

(ii) 2

gains 2 marks
(if answer incorrect, 20 / 1000 × 100 gains 1 mark)

2

(b) *ideas that*
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

any three for 1 mark each
references to respiration regarded as neutral

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]

13 (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]

14

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]

15

(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]

16 (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** CH_4*

1

[5]

17 (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
<u>both</u> of the mark points are not gained

(d) any **two** from

- 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

2

[7]

18 (a) any **one** from:

herbicide

accept weedkiller

pesticide

accept insect killer
*do **not** accept fertilisers*

1

(b) any two from:

- (fossil) fuels are burned
- sulphur dioxide is released
- (sulphur dioxide) dissolves / reacts (in water)

accept sulphur oxides are released

2

[3]

19 (a) any two from:

agriculture

*accept land to grow crops **or** graze cattle*

buildings

roads

any 2 <u>different</u> 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 <u>electricity</u>

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]

20 any **three** from

building

accept building of houses, roads, power stations

quarrying

farming

'dumping' waste

[3]

21 (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]

22 **Quality of Written Communication**

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

1

any **three** from:

coal / fossil fuel is <u>burned</u>

(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]

23 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]

24 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]

25 (a) carbon dioxide

1

methane

1

greenhouse effect

1

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

1

[4]

26 (a) 12 500

incorrect numerical answer but clear evidence of correct working e.g. 365 million ÷ 365 ÷ 80 ***or*** *3285 million ÷ 365 ÷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

[10]

27 (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

[5]

28 (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]

29 *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]

-

30 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]

31 *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]

32

- roads
- factories / industries
- airports
- railways
- housing estates / towns / cities
- farms / farming / crops
- quarries / mines
- theme parks
- play areas
- rubbish dumps

'Buildings' as an only answer

award one mark

any sensible answers which refer to land being covered
[Do not allow deforestation, pollution, golf courses, parks]

any three for 1 mark each

[3]

33

- methane is given off from rice fields
- industry / burning fossil fuels which increases CO_2 in the atmosphere
- deforestation increases CO_2 due to burning / rotting trees
- deforestation means less CO_2 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 <u>not</u> credit references to cattle producing methane or to effects of global warming)

[NB

- *claims that SO_2 a greenhouse gas and/or referring to acid rain*
- *referring to ozone layer[deduct 1 mark for each]*

[5]

34

(a) carbon dioxide / methane / natural gas / North Sea gas
(credit CO_2 / CH_4)

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]