AQA GCSE BIOLOGY (HIGHER) · 8461

# BIOLOGY



## MARK SCHEME

### 4.7.5 FOOD PRODUCTION (PACK 2)

| SCORE | PERCENTAGE |
| --- | --- |
| /56 | % |

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## Q1.

(a) 115

**1**

(b) any **four** from

less energy lost / used

as heat lost to the atmosphere

since warm indoors

*accept temperature controlled*

(less energy lost) in movement

since movement restricted

more growth / eggs

*accept prevents loss of body mass **or** gets fatter / weight gain*

**4**

**[5]**

## Q2.

(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**



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(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]**

## Q3.

(a) both axes labelled
both axes appropriate scale
plotting 7 correct
good attempt at line graph

*each for 1 mark*

**4**

(b) more fertiliser added more yield increased

*gains 1 mark*

**but**
yield increases with fertiliser up to maximum

*gains 2 marks*

yield **increase** slows down above 125/150 kg/ha

*either for 1 further mark*

(do **not** allow yield falls)
maximum yield with 175 kg/ha

**3**

**[7]**



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## Q4.

(a) (i) carbohydrate*/fat/protein in cell
(or example e.g. glucose/starch)

*for 1 mark*

**1**

(ii) $\frac{21500}{1050000} \times 100$ or 2.(05)%

*for 1 mark*

**1**

(b) *ideas that:*
little energy used for growth/most wasted/lost

*gains 1 mark*

**but**
only 4% used for new growth

*gains 2 marks*

evidence/idea that this is repeated at each stage
idea of diminishing return/less energy at each stage

*for 1 mark each*
*(maximum of 3)*

**3**

(c) *idea:*
plants at the start of all food chains
shorter food chain
more efficient/less energy lost/more food
cheaper/more economic
(must bear consequence of at least one of earlier marks)

*any three for 1 mark each*

**3**

**[8]**

## Q5.

*ideas that:*

**large mesh**
allows small fish to escape so they live long enough/grow big enough to breed
maintains stocks

**close season**
maintains stocks
unless catch more in rest of time
especially important in breeding season

**closed areas**
maintains stocks
especially important for breeding grounds
but can't make fish stay inside area



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**quotas**
maintains stocks
*plus* difficulty of enforcement of any/all of above

*any 7 for 1 mark each*

**fisherman** (effect of controls on)
reduced catches/less income ∴ controls
harder to catch fish
but will ensure their future

*any 3 for 1 mark each*
*to max. of 9*
*(credit other good but unanticipated reasons)*

**[9]**

## Q6.

(a) Decrease: seals will eat more squid and penguins

*for 1 mark*

**1**

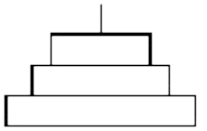
Stay the same:
- more shrimp/food for squid and penguins

*ideas that*

- increase in squid and penguins balances the extra eaten by seals
- seals find other prey (allow start to eat shrimps)

*any two for one mark each*

**2**

(b) 

*credit*  *for seal*

*allow*



- correct shape (doesn't need to be to scale)
- correctly with organisms

*(if wholly correct but inverted then credit 1 mark)*

*each for 1 mark*

**2**

(c)
- seals are mammals
- *idea that* seals have (to maintain) a constant body temperature
  *[allow warm blooded]*



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- heat losses to cold seas
- more of food eaten used to replace heat loss

*(credit <u>use</u> of figures* i.e. 95% loss compared to 90%
or 5% efficient compared to 10%
or 20 : 1 conversion ratio compared to 10 : 1
*with 1 mark)*

*any three for 1 mark each*

**3**

(d) (i) *ideas that*

- reduce number of fishing boats allowed
- breed in captivity and then release
- agree quotas [not an unqualified 'ban']
- avoid breeding areas
- avoid breeding seasons
- increase size of net mesh/don't catch small fish
- limit catches of shrimps
- cull seals

*any two for 1 mark each*
*[allow any other reasonable answer]*

**2**

(ii)
- breeding areas closer to some countries than others
- difficult to police/easy to cheat/'poach'
- difficult to agree quotas
- some countries eat more fish than others
- best weather for fishing maybe in breeding seasons
- fisherman/trawlers need employment
- big demand for cod

*any one for 1 mark*
*[allow any other sensible response]*

**1**

**[11]**

## Q7.

(a) *idea that*

- so they don't get too hot / cold

*for high temperatures*



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- don't lose condition / weight **or** don't become ill
- don't lose too much water / become dehydrated
  (*allow* don't sweat too much)
  *for low temperatures*
- reduce heat loss from pigs
- less energy wasted in maintaining body temperature
  *for 1 mark each*

**2**

(b)
- reduce energy loss by movement
- so more is available for growth*
  *(*credit this point if given in (a) but only credit once)*
- don't use body mass to provide energy
- easier to handle / monitor
  *for 1 mark each*

**2**

(c) *idea that*

- less humane / not natural / cruel / no room to exercise / stressful
- more intensive labour
- increased risk of disease / (often) in contact with faeces
- antibiotic residues in meat
  *any two for 1 mark each*

**2**

**[6]**



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