AQA GCSE BIOLOGY (HIGHER) · 8461

BIOLOGY



MARK SCHEME

4.7.1 ADAPTATIONS, INTERDEPENDENCE AND COMPETITION (PACK 4)

SCORE	PERCENTAGE
/117	%

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Mark schemes

Q1.

(a) 1 for insulation / prevents heat loss

keeps cold out neutral keeps it warm neutral

1

2 camouflage / other animals cannot see it

1

(b) 1 heat loss

reject shade

1

2 insulation from hot sand / prevents heat passing from sand / prevents burning

1

[4]

Q2.

(a) any **three** from

different factors are required for each mark

hares breeding

(amount) of food **or** plants available

eaten by lynx **or** predators **or** reference to size of lynx / predator population

hares dying **or** reference to being killed by humans

disease (spreads through the population)

(competition) for space **or** (lack of) space)

*alternative to either of these points but not both change in environment **or** habitat*

temperature **or** weather **or** climate

3

(b) any **two** from

more food **or** hares for lynx encourages more breeding (in lynx)

accept less food, less breeding

more food **or** hares allows greater survival rate of cubs **or** adult lynx

accept less food, less survival

idea of time lag for breeding **or** time lag for dying

2

[5]

Q3.

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(a) (i) to go under teeth **or** mower

accept not damaged by grazing animals

accept do not get cut or bitten

accept reduces competition by other plants

do not credit maximum surface of leaves facing Sun

1

(ii) any **one** from

it can force its way through grass roots

accept in competition with grass roots

it is a store of food (to help the plant recover)

do not credit a good store of water

to reach down to water

to give good anchorage

accept it is hard to pull up

1

(iii) any **one** from

to reach more light

*accept to get out of the shadow of the hedge **or** tall grass*

to let seeds be caught on animals' coats (more easily)

*accept improves access **or** visibility **or** ease for pollination*

do not credit to help it grow up the hedge

1

(iv) any one from

(they reach out from hedge) to find water

accept increase surface area

*accept to find nutrients **or** minerals*

do not award mark if food mentioned

to give good anchorage

1

(b) (i) gene **or** allele

do not credit chromosome

1

(ii) any **one** from

they do not crossbreed **or** interbreed

*accept different species do not breed together **or** do not fertilise each other*

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do not produce fertile offspring

have different numbers or types of chromosomes

accept genes are incompatible

*do not credit have different genes **or** are genetically different*

do not credit do not pollinate each other

1

(c) one mark is for the adaptation and one is for an appropriate reason

have white fur

for camouflage

are huge

for large volume to surfae area

thick layer of fat

*for insulation or to reduce heat loss **or** retain heat*

*do not credit to stop it losing heat **or** withstand the cold **or** keep it warm*

have thick fur

*for insulation **or** to reduce heat loss **or** retain heat*

hibernate

to avoid the coldest part of year

is a carnivore

because animals provide high energy food

has big paws **or** claws

to be able to walk on snow

have small ears

to reduce heat loss

have furry feet

for insulation from the snow

2

[8]

Q4.

(a) diatoms photosynthesise **or** are producers

1

the amount of growth depends upon the energy **or** light they get

accept more light means more growth
***or** they multiply more in more light*
do not accept they need light

1

(b) (i) eaten by small fish

do not accept eaten by fish

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1

minerals **or** nitrate **or** phosphates
or nutrients **or** food supply used up
or reduced

1

(ii) any **two** from

gets colder
light decreases
end of their life span **or** die

accept more being eaten than being formed

eaten by small fish

*do not accept a decrease in nitrates **or** phosphates*

1

(c) increased minerals **or** nitrates **or** phosphates

1

any **one** from

due to death **or** decay of diatoms **or** fish

do not accept death of large fish

1

influx of minerals in an ocean current

*do not accept extraneous pollution **or** dumping by a ship*

1

[8]

Q5.

(food chain) A gives 7200kJ
(of useful energy)

***or** 7.2MJ*
***or** 7200000J*
unit essential in each case

1

(food chain) B gives 960kJ (of useful energy)

***or** 0.96MJ*
***or** 960000J*
unit essential in each case
*credit 1 mark if **both** are numerically correct but unit omitted*

1

same comparison made in **each** case
e.g. for each kilogram of grain

***or** refers to more stages in food chain results in less efficiency*

1

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(so) (food chain) A is 7.5 times more efficient than (food chain) B

or *for every unit of useful energy given to a person by B, A gives* $7\frac{1}{2}$ *units*

or *food chain B is only 13(.3)% as efficient as food chain A*

or *makes a correct comparison in percentage terms*

1

[4]

Q6.

(a) (i) correct reasons - different

light	protection
moisture	pH/acidity/alkalinity
temperature	soil
nutrients	air
genetic differences	

any 2 for 1 mark each

[mark solely on different environmental condition]

2

(ii) grow different dandelions in the same conditions

for 1 mark each

or

grow the same type of dandelions in different conditions

for 1 mark each

2

(b) dandelions shorter/smaller/same height

for 1 mark

because (named) condition changes

for 1 mark

[may refer to answer in a(i)]

2

[6]

Q7.

(a) trees in wood (allow converse)
taller
fewer leaves
thinner trunks
fewer branches
branches/leaves at top only

any 2 for 1 mark each

2

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(b) light
water
space
nutrients
(*allow up to 2 named substances e.g. CO_2/O_2/NO_3)*
any 3 for 1 mark each

3

[5]

Q8.

(a) (i) predator (allow carnivore)

(ii) prey
each for 1 mark

2

(b) fewer ladybirds; because less food/ladybirds starve
or
no change; because alternative food supply
each for 1 mark

2

(c) any two suitable environmental effects e.g.
food;
diseases;
other predators;
space;
insecticides
any two for 1 mark each

2

[6]

Q9.

idea brown colour/plain shell inconspicuous
for 1 mark

less likely to be eaten
gains 1 mark

but
less likely to be eaten <u>before breeding</u>
gains 2 marks

so alleles (genes) passed on
for 1 mark
(N.B accept inverse of any of the above)

[4]

Q10.

(a) B plants are:
taller

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smaller/thinner leaves
thinner stem or vice versa in referring to A plants

any two for 1mark each

2

(b) water/rain/moisture
nutrients/any specific mineral (N/P/K)

each for 1 mark

2

[4]

Q11.

(a) *idea:*
wood goodness recycled/crops goodness removed

gains 1 mark

1

but
wood minerals/nutrients recycled/crops remove nutrients/minerals

gains 2 marks

wood and crops compared

for 1 mark

2

(b) (add) fertiliser/nutrients/minerals
(add) manure/animal waste/compost

any two for 1 mark each

(accept move to new area for 1 mark)
rotation

max marks 2

2

[5]

Q12.

(a) predator/carnivore

(not consumer/hunter)

for 1 mark

1

(b) (i) number decrease
not 'no' <u>less</u> food (for large mites)/less prey/fewer small mites <u>to eat</u>
(not 'fewer small mites' etc)
starve/cannot grow/cannot breed/die/die out

each for 1 mark

3

(ii) increase small mites breeding faster (than they are eaten)

each for 1 mark

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(accept different food found)
decrease = O maths but 1 mark for possible reason can be awarded - more (small mites) eaten

each for 1 mark

2

[6]

Q13.

(a) idea

- unbanded dominant/plain **or** banded recessive
- because banded appears in young/
- parents heterozygous/Bb
- offspring BB } Bb } Bb } bb } credit response consistent with parents even if not both heterozygous

  Accept any clear and consistently used notation
- identify BB, Bb as plain
- identify bb as banded
- ratio 3:1 unbanded/banded (stated or clearly implied
- matches 35:12 results e.g. <u>all</u> the outcomes clearly identified as banded/unbanded)

for 1 mark each

7

(b) *idea*

- many genes control [accept "continuous variation"]
- many alleles for a gene/large genepool
- snails can inherit lots of different combinations
- mutation (gives rise to many alleles)
  allow selection allows alleles to be passed on unless [very]disadvantageous or if advantageous

any 4 for 1 mark each

[Also credit, for 1 mark each, up to <u>2</u> causes of mutation, e.g. mistakes in cell division, radiation]

4

[11]

Q14.

idea

- banded snails camouflaged/less easily seen

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- fewer banded eaten [by birds]
- more banded survive <u>to breed</u>
- more genes for banded passed on
  or more banded snails in population

for 1 mark each

<u>N.B.</u>
Accept reverse of all above for plain snails
*All 4 marks may be gained by a relatively short response

[4]

Q15.

(a) *idea:*
soil wetter
soil less aerated
less food for moles/voles/foxes/badgers/birds
soil less fertile (less leaves in soil <u>not</u> enough on its own)
less food grown
earthworms die out/fewer earthworms
(<u>not</u> just "earthworms get eaten")

any 4 for 1 mark each

4

(b) method
advantage
disadvantage
*e.g.**

- chemical
- kills worm/affects reproduction/maintains earthworm population
- persistent/food chain/kill earthworm

or

- import biological central/predator/disease/parasite
- kills worm/affects reproduction/maintains earthworm population
- may attack other animals/cause same sort of problems as New Zealand worms

(* credit other plausible suggestions for method/advantage/disadvantage)

for 1 mark each

3

[7]

Q16.

(a) predator
prey

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no alternatives
for 1 mark each

2

(b) *idea that*
(wasps) increase OR decrease
gains 1 mark

but
(wasps) increase then decrease/peaks at
gains 2 marks
answers must match

idea of change in food supply/whiteflies
more food/whiteflies OR less food/ whiteflies
gains 1 mark

but
more food/whiteflies then less food/whiteflies
gains 2 marks

or
wasps follow trend in whiteflies
for 2 marks

or
linked to increase/decrease other environmental effects
e.g. more/less food for wasps, use of insecticide
e.g. temperature change, other predator
If increase/decrease not given then second part (reason) gains no marks
for 1 mark each

4

(c) *idea that*
wasps die out/die off/fly away/migrate/leave greenhouse but NOT 'die' alone
for 1 mark

1

[7]

Q17.

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]

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Q18.

(a) too cold in Britain / warmer in Africa

- no insects / food in Britain / insects / food in Africa / insects are hibernating in Britain

each for 1 mark

[Take answers to refer to Africa unless otherwise stated]
[Do not allow 'because of climate]

2

(b) feed at different heights

for 1 mark
[Comparison is required if answer is quoted from information given]

1

(c) insects they eat are carried up on air currents
this doesn't happen until ground / air has warmed

for 1 mark each

2

[5]

Q19.

ideas that

- trees hang over the sea / grow close to the sea / on the shore – coconuts drop into the sea. or similar *(not just simply 'spread)*
- wax / fibres (trapped air) – stop the fruit sinking / provide water resistance
- water store – supply water until root reaches a supply
- nutrient store – supply nutrients/salts until root reaches supply
- hard shell – to protect from breakage on landing / to protect the embryo from feeding animals.

[Award maximum of 1 mark for 2 survival / spread features or 1 survival + 1 spread feature]

for 'Fibres stop the fruit sinking'

'Wax provides water resistance'

Award 2 marks
any three for 1 mark each

[3]

Q20.

(a) idea that

- light doesn't reach deeper parts
- plants need / absorb light

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- to make food

gain 1 mark each to maximum of 2

but
so they can photosynthesise

gains 2 marks

2

(b) herring will be on the bottom
herring follow / will be feeding on the copepods — independent marking points

for 1 mark each

2

[4]

Q21.

(a) idea of camouflage / blend in with / protection against predators

for 1 mark

1

(b) only active when it is cool / stay out of the heat by day / avoid predators / it is cooler

for 1 mark

1

(c) conserve / do not waste water / do not lose water / avoid dehydration / can't obtain water easily / only get water from food

for 1 mark

1

(d) release body heat / keep cool

(*allow* feet / tail stop rat sinking into sand / keep balance / for stability / easier movement in sand / run faster)

for 1 mark

1

[4]

Q22.

(a) prey

for 1 mark

1

(b)
- disease
- eaten (by predators) / predators
- (over)fished / caught by fishermen
- competition for food / not enough food (for all the baby fish) / no food

(*do not allow* they migrate or move elsewhere)

any three for 1 mark each

3

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[4]

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