

GCSE BIOLOGY

Topic Paper: 6.2 Variation and evolution
Part 1 & 2 Mark Scheme

MARK SCHEME



75 Marks



- M1.** 3 of e.g.
new predators
new diseases
new competitors
environmental changes (initiated by Man)
each for 1 mark

[3]

- M2.** (a) (soft) body parts / other parts / named parts
accept flesh

1

decayed / decomposed / rotted / eaten

or

bones do not decay / decompose / rot / get eaten
ignore disintegrated / dissolved
ignore microorganisms

1



(b) any **one** aquatic feature from: eg

streamlined body shape

long tail

eyes on top of head

scales

fins / paddles / flippers / webbed feet

ignore gills

1

any **one** terrestrial feature from:

(front) legs / limbs / hands

could lift front end upwards

ignore feet

accept for 2 marks eg fin / flipper can be used for walking

or fins like legs

1

[4]

M3. *idea that*

variations / mutations / differences in genes / alleles (in wild salmon population)

adapted to own river

any appropriate difference between rivers

e.g. flow rate, waterfalls, pH, temperature, food supply, disease predators, competitors

homing instinct

for 1 mark each

survive to breed

gains 1 mark

but

pass on genes to offspring

gains 2 marks

[4]



M4. (a) any **four** from:

mutation / variation

produces smaller wings / fatter body

must be linked to mutation / variation

wings no longer an advantage since no predators

allow wings / flight not needed as no predators

wings no longer an advantage since food on ground

allow wings / flight not needed as food on ground

fatter body can store more energy when fruit scarce

successful birds breed / pass on genes

4

(b) any **one** from:

evidence has all gone

no scientists on island at time to record evidence

no records (from sailors)

1

[5]

M5.

(a) mutation

for 1 mark

1

(b) fall,

idea that resistant beetles more likely to survive to breed,

∴ their offspring more likely to appear in the next generation

for 1 mark each

3

(c) inbreeding between resistant brothers and sister,
will produce some individuals with 2 copies of the resistance allele,
if 2 of these individuals breed all their offspring will be resistant

for 1 mark each

3

[7]



M6. natural variation in amount of body hair;
in cold environment, (having genes) which produce long hair is an advantage;
because hair insulates; OWTTE
such animals more likely to survive;
and pass these genes onto succeeding generations

each for 1 mark

[5]

M7. (a) lack of fossils / fossils destroyed

allow lack of evidence

1

(due to soft parts) decaying / geological activity

allow an example – eg vulcanism or earth movements or erosion

allow converse points re skeletons, shells, hard parts

1

(b) (i) **A** and **B** did not mate successfully

'A and B did not mate' insufficient

allow did not produce fertile offspring

1

(ii) any **two** from:

may not be mating season

A and **B** may not find each other attractive

this is just a one-off attempt / an anomaly / need repeats

may be juvenile / immature

may be the same sex

allow other sensible suggestion eg were put in unfavourable

environment or one / both could be infertile

2



- (c)
1. (two ancestral populations) separated (by geographical barrier / by land) / were isolated 1
 2. genetic variation (in each population) **or** different / new alleles **or** mutations occur 1
 3. different environment / conditions
allow abiotic or biotic example 1
 4. natural selection occurs **or** some phenotypes survived **or** some genotypes survived 1
 5. (favourable) alleles / genes / mutations passed on (in each population) 1
 6. eventually two types cannot interbreed successfully
allow eventually cannot produce fertile offspring 1
- [11]**

- M8.**
- (a) there is a lack of valid / reliable evidence 1
- because the early organisms were soft bodied **or** because remains were destroyed by geological action 1
- (b) populations of salamanders became isolated / separated 1
- by areas between mountains 1
- there was genetic variation in these isolated communities 1
- natural selection acted differently on these isolated communities 1
- eventually resulting in interbreeding being no longer possible and so new species have been formed 1
- [7]**

- M9.**
- (a) fossil is (remains / impression of) organism that lived a long time ago
if numbers, ≥ 1000s years 1
- fossils show changes over time **or** older fossils simpler **or** fossils simpler than present-day species 1



fossils have similar features to present-day species

allow fossils allow us to compare old species with present-day species

1

(b) isolation / separation / splitting

1

by geographical barrier / sea

ignore other examples

1

there was variation (in these isolated populations) / different alleles

accept mutation

1

different environmental conditions **or** example eg climate / predators / food

1

natural selection acted on the isolated populations

accept became adapted in each area

1

OR

only certain allele(s) passed on to offspring / different alleles passed on in different environments

allow genes

so differences lead to inability to interbreed

allow differences described – eg mismatch of genitalia / different courtship displays / different breeding seasons

1

[9]

M10. (a) (i) DNA replication / copies of genetic material were made

'it' = a chromosome

allow chromosomes replicate / duplicate / are copied

ignore chromosomes divide / split / double

1

(ii) one copy of each (chromosome / chromatid / strand) to each offspring cell

ignore ref. to gametes and fertilisation

1

each offspring cell receives a complete set of / the same genetic material

allow 'so offspring (cells) are identical'

1

(b) (i) meiosis

allow mieosis as the only alternative spelling

1



(ii) Species A = 4 **and** Species B = 8 1

(iii) sum of A + B from (b)(ii) e.g. 12 1

(c) (i) similarities between chromosomes
or
similarities between flowers described
e.g. shape of petals / pattern on petals / colour / stamens 1

can breed / can sexually reproduce
allow can reproduce with each other / they can produce offspring 1

(ii) any **two** from:

offspring contain 3 copies of each gene / of each chromosome / odd number of each of the chromosomes

some chromosomes unable to pair (in meiosis)

(viable) gametes not formed / some gametes with extra / too many genes / chromosomes

or
some gametes with missing genes / chromosomes 2

[10]

M11. (a) organisms that can breed together
accept converse points re. 2 different species 1

successfully
accept produces fertile offspring 1

(b) any **two** from:
(live at)

different pH of soil

different height above sea level

different flowering times 2

AND

genetic variation / mutation / different alleles (produced in isolated populations) 1



natural selection acts differently on the two populations

or different characteristics in the two populations survive

or different alleles passed on in the two groups

1

eventually resulting in interbreeding no longer possible

1

[7]