Part c was straightforward. A statement such as 'DNA is double stranded' without any reference to the structure of mRNA was not awarded marks.

Most students correctly identified tRNA in part d but fewer could go on and clearly describe the role that it has. Students should be encouraged to express biological concepts in their own words and in a manner that clearly conveys to the reader their understanding of the concepts.

Part e was well done. Students were required to correctly spell cytosine, adenine and codon in order to attain full marks.

In part g those students who correctly identified that UGA coded for stop but did not go on to state the consequence on the translation of the polypeptide were not awarded a mark.

In part h, a statement such as 'is when inheritance is due to presence of many genes' was not awarded a mark. This was a typical example of the poor expression seen in the responses to this question.

Part j was generally well done.

5a–b (1.22; 2)

a. Predatory fish.

b. More likely to attract females and so more likely to reproduce and contribute to the next generation
OR
no advantage in being camouflaged since there are no predators.

5c (1.19; 4)

c.
- variation in the original laboratory population with respect to the colour of spots, predatory fish eat more brightly coloured guppies leaving a higher proportion of dull coloured guppies to breed
- colour of spots is inherited and passed onto offspring of the surviving fish
- since more dull coloured fish remain to pass this trait onto their offspring the next generation has a higher proportion of dull coloured fish
- selection by predators occurs in the next generation and the cycle is repeated so that after 10 generations all offspring are dulled coloured.

5d–e (0.9; 2)

d. One of the following: temperature of the water, velocity of the water, food source, etc.

e. To confirm the change in frequency of the phenotypes is not due to something specific to the laboratory (or the wild).

A response of predators was not regarded as sufficient in part a.

Part b was generally well done.

In part c common errors in student responses included:
- *reciting a general outline of natural selection without any reference to the guppies*
- *failure to indicate that the colour of spots is inherited*
- *listing procedural steps in the experiment rather than steps in the process of natural selection.*

A number of students displayed a poor understanding of the concept by using statements such as 'the guppies were forced to change to dull coloured spots in order to survive' or 'the gene for dull coloured spots gradually becomes dominant in the population'. Poor expression was also evident in many responses.

Most students could answer part d but not part e.

6a (0.55; 2)

a. Geographic isolation results in lack of migration between the populations
OR
no gene flow
OR
prevents interbreeding
AND
due to mutations and/or differing selective pressures genetic differences accumulate.

6b (0.12; 1)

b. The degree of difference in the nucleotide bases is proportional to the amount of time since there was mixing of genetic material
OR
the greater the number of mutations in the cytochrome b gene the greater the time since there was a common ancestor.

6c (0.52; 2)

c. When comparing differences in cytochrome b between members of the same species within a rainforest region either there are no differences
AND
however there are differences when members of the same species from the 2 different regions (which were separated during global cooling) are compared (except for scrub wrens).

6d (0.11; 1)

d. Skinks are less mobile compared to the birds who fly, therefore less gene flow in the skink population leading to greater accumulation of differences.

6e (0.4; 2)

e. All scrubwrens now derived from the population remaining in region B
OR
scrubwrens from region B migrated into region A
the remaining population in region B may have been small
therefore all scrubwrens were derived from a small sample of scrubwrens – small gene pool
AND
the remaining population (if larger) in region B may have had very little diversity.

In part a most students could discuss the effect of differing selective pressures on the populations, fewer referred to the lack of gene flow between the 2 populations.

Very few students could adequately describe the required relationship in part b.

The major problem encountered by students in part c was in the interpretation of the information provided in the table. Many students thought that there was a group of animals living in a third region that existed between region A and region B. Other students discussed differences between species instead of differences between members of the same species.

Parts d and e were poorly completed by the majority of students.

7a (0.4; 1)

a. The muscles and the skeleton of the wing of all bats are similar.

7b (0.62; 2)

b. Any two of:
- the two suborders of bats do not share a recent common ancestor
- the primates and Megachiroptera share a common ancestor
- the Microchiroptera diverged before the Megachiroptera and Primates
- bats evolved twice in history
- convergent evolution in the two suborders of bats.

7c (0.43; 2)

c. Because blood proteins are coded for by genes, closely related organisms share a similar genotype.

7d (0.69; 2)

d. An example of convergent evolution:
meaning that the same selective pressures must have operated in two distantly related groups
OR
similar environments or habitats result in the development of similar structures.

In part a, an answer stating bats have similar muscles and wings was not sufficient to obtain full marks. Students must read the article and in their answer use all of the relevant information given.

Many students could not clearly express their response in part b. Two suborders of bats were involved, so a statement such as 'the bats descended from the primates' could not be awarded marks.

In part c, a large group of students tried to link blood proteins with the differing diets of the two suborders, rather than with the synthesis of these proteins and the direct connection back to the DNA.

Part d was generally well answered.

8a–b (1.91; 4)

a.i. Carbon dating is only efficient for younger fossils
OR
fossil too old.

a.ii. The fossil could be dated using
Isotopes of Uranium, Rubidium, Potassium
OR
a radioactive isotope which has a longer half life than carbon
OR
date the surrounding rock.

b. Any two of:
- evidence of gill-like structures
- web-like feet
- tail shape suitable for locomotion in water
- eyes on the top of the head.

8c–e (2.49; 6)

c. Any two of:
- fossilised stomach contents
- teeth shape and size for tearing and chewing flesh
- evidence that jaws are large and powerful
- eyes directed forward.

d. Any two of:
- buried by sediment
- no oxygen therefore no bacterial decay
- weight of deposits water squeezed out
- low acidity.

e. Structures similar in underlying structure in different species as a result of a common evolutionary origin
OR
Structures, derived from the same basic plan, which may have been modified for different functions
AND
an example such as the forelimbs of mammals.

Part a was generally well done.

Some students did not attain full marks for parts b and c because their responses were too brief. For example a response such as 'teeth' was not awarded a mark in part c, more information about the teeth was required.

In part d many students could show that they had a good understanding of the conditions necessary for fossilisation to occur. Some students, however, thought that the brachiopid needed to be rapidly buried by sedimentary rock.

Many students could give an example of homologous structures in part e but could not define what they are. Some tried to give a definition of homologous chromosomes.