

AS Level Biology B
H022/01 Foundations of biology

Question Set 6

1 Certain geographical regions of the Earth have high species diversity including large numbers of species that are unique to these regions. Such species are called endemic species.

(a) (i) What is meant by the term species diversity?

[2]

(ii) Some geographical regions are threatened with habitat loss and have been prioritised for conservation. Such regions are known as biodiversity hotspots.

To be identified as a biodiversity hotspot a region must:

- have at least 0.5% of the Earth's 300 000 plant species as endemic species;
- have lost at least 70% of its original habitat.

Table 1 shows some data about two geographical regions, Madagascar and New Zealand.

Geographical region	Original habitat (km ²)	Remaining habitat (km ²)	Number of endemic plant species
Madagascar	594 150	59 038	9704
New Zealand	270 500	59 400	1865

Table 1

Analyse the data in Table 1 **and** compare these geographical regions as potential biodiversity hotspots.

[4]

(b) The rosy periwinkle, *Catharanthus roseus*, is one of the plant species found in Madagascar where it has evolved adaptations to survive in the hot and humid climate.

Describe the adaptations that plants such as *C. roseus* could have evolved to survive in a hot and humid climate?

[2]

(c) Researchers have discovered that the leaves of *C. roseus* contain chemicals that can disrupt mitosis in actively dividing cells.

(i) Suggest a potential medicinal use for these chemicals.

[1]

(ii) One of these chemicals acts by binding to spindle fibres to prevent the separation of sister chromatids.

Which **stage** of mitosis is prevented by this chemical?

[1]

(d) Genetic diversity was investigated in coloured variants of *C. roseus*.

Genetic data from an analysis of 56 genes showed that 10 of these genes were monomorphic.

Calculate the proportion of polymorphic genes in this population of *C. roseus*.

Give your answer to **two** significant figures.

Answer = [2]

Total Marks for Question Set 6: 12



Oxford Cambridge and RSA

Copyright Information

OCR is committed to seeking permission to reproduce all third-party content that it uses in its assessment materials. OCR has attempted to identify and contact all copyright holders whose work is used in this paper. To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced in the OCR Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download from our public website (www.ocr.org.uk) after the live examination series.

If OCR has unwittingly failed to correctly acknowledge or clear any third-party content in this assessment material, OCR will be happy to correct its mistake at the earliest possible opportunity.

For queries or further information please contact The OCR Copyright Team, The Triangle Building, Shaftesbury Road, Cambridge CB2 8EA.

OCR is part of the Cambridge Assessment Group; Cambridge Assessment is the brand name of University of Cambridge Local Examinations Syndicate (UCLES), which is itself a department of the University of Cambridge