

© International Baccalaureate Organization 2025

All rights reserved. No part of this product may be reproduced in any form or by any electronic or mechanical means, including information storage and retrieval systems, without the prior written permission from the IB. Additionally, the license tied with this product prohibits use of any selected files or extracts from this product. Use by third parties, including but not limited to publishers, private teachers, tutoring or study services, preparatory schools, vendors operating curriculum mapping services or teacher resource digital platforms and app developers, whether fee-covered or not, is prohibited and is a criminal offense.

More information on how to request written permission in the form of a license can be obtained from <https://ibo.org/become-an-ib-school/ib-publishing/licensing/applying-for-a-license/>.

© Organisation du Baccalauréat International 2025

Tous droits réservés. Aucune partie de ce produit ne peut être reproduite sous quelque forme ni par quelque moyen que ce soit, électronique ou mécanique, y compris des systèmes de stockage et de récupération d'informations, sans l'autorisation écrite préalable de l'IB. De plus, la licence associée à ce produit interdit toute utilisation de tout fichier ou extrait sélectionné dans ce produit. L'utilisation par des tiers, y compris, sans toutefois s'y limiter, des éditeurs, des professeurs particuliers, des services de tutorat ou d'aide aux études, des établissements de préparation à l'enseignement supérieur, des fournisseurs de services de planification des programmes d'études, des gestionnaires de plateformes pédagogiques en ligne, et des développeurs d'applications, moyennant paiement ou non, est interdite et constitue une infraction pénale.

Pour plus d'informations sur la procédure à suivre pour obtenir une autorisation écrite sous la forme d'une licence, rendez-vous à l'adresse <https://ibo.org/become-an-ib-school/ib-publishing/licensing/applying-for-a-license/>.

© Organización del Bachillerato Internacional, 2025

Todos los derechos reservados. No se podrá reproducir ninguna parte de este producto de ninguna forma ni por ningún medio electrónico o mecánico, incluidos los sistemas de almacenamiento y recuperación de información, sin la previa autorización por escrito del IB. Además, la licencia vinculada a este producto prohíbe el uso de todo archivo o fragmento seleccionado de este producto. El uso por parte de terceros —lo que incluye, a título enunciativo, editoriales, profesores particulares, servicios de apoyo académico o ayuda para el estudio, colegios preparatorios, desarrolladores de aplicaciones y entidades que presten servicios de planificación curricular u ofrezcan recursos para docentes mediante plataformas digitales—, ya sea incluido en tasas o no, está prohibido y constituye un delito.

En este enlace encontrará más información sobre cómo solicitar una autorización por escrito en forma de licencia: <https://ibo.org/become-an-ib-school/ib-publishing/licensing/applying-for-a-license/>.

Biology
Standard level
Paper 1B

12 May 2025

Zone A afternoon | **Zone B** afternoon | **Zone C** afternoon

Candidate session number

1 hour 30 minutes [Paper 1A and Paper 1B]

--	--	--	--	--	--	--	--	--	--

Instructions to candidates

- Write your session number in the boxes above.
- Do not open this examination paper until instructed to do so.
- Answer all questions.
- Answers must be written within the answer boxes provided.
- A calculator is required for this paper.
- The maximum mark for paper 1B is **[25 marks]**.
- The maximum mark for paper 1A and paper 1B is **[55 marks]**.



Answer **all** questions. Answers must be written within the answer boxes provided.

1. Whole genome sequencing has allowed scientists to compare the genetic content of different organisms. The table shows the genome sizes of some plants and animals.

Organism	Scientific name	Genome size in million base pairs (mbp)
Nematode worm	<i>Caenorhabditis elegans</i>	100
Thale cress plant	<i>Arabidopsis thaliana</i>	160
Fruit fly	<i>Drosophila melanogaster</i>	180
Tiger pufferfish	<i>Takifugu rubripes</i>	400
Rice plant	<i>Oryza sativa</i>	490

- (a) There are 64 million adenine–thymine base pairs in the genome of the nematode worm. Deduce the number of cytosine–guanine base pairs in the genome. [1]

.....

- (b) State **one** organelle in which a base pair could be found. [1]

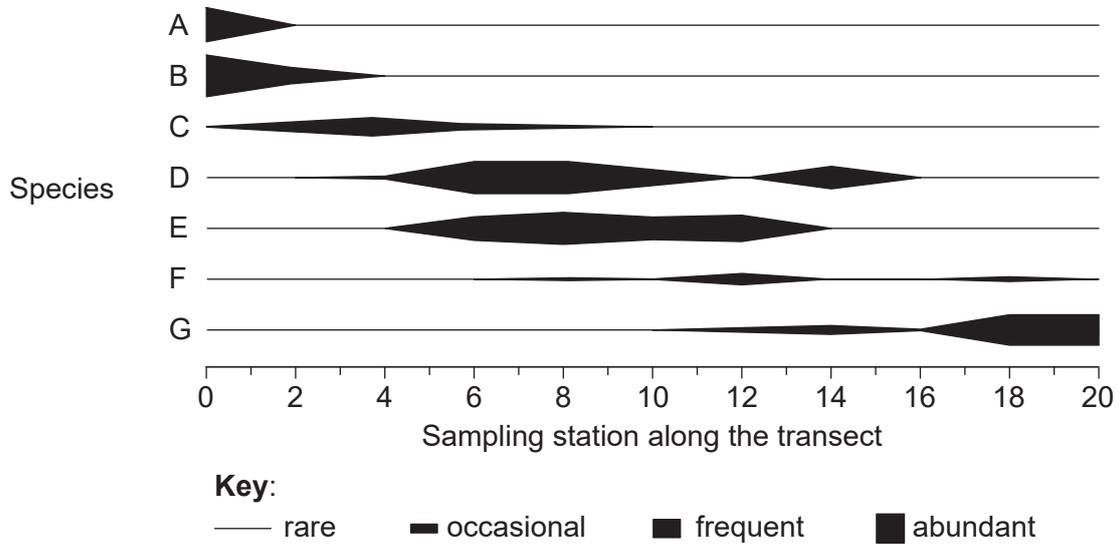
.....

- (c) Discuss the current and potential future uses of whole genome sequencing. [3]

.....
.....
.....
.....
.....
.....



2. A student set up a 20-metre transect line along a rocky shore and measured the abundance of seven species of seaweeds (A–G) at 21 different sampling stations at fixed distances. The kite diagram represents the species abundance data across the 20 metres.



(a) (i) Identify **two** species that are best adapted to the same abiotic conditions. [1]

1.

2.

(ii) Identify the organism that is least abundant on the rocky shore. [1]

.....

(b) Discuss possible reasons why species A is found between sampling stations 0 and 2, while species G is found between sampling stations 10 and 20. [3]

.....

.....

.....

.....

.....

.....

(This question continues on the following page)



08EP03

Turn over

(Question 2 continued)

- (c) Seaweeds are obligate aerobes. Describe an environmental condition required for seaweed survival.

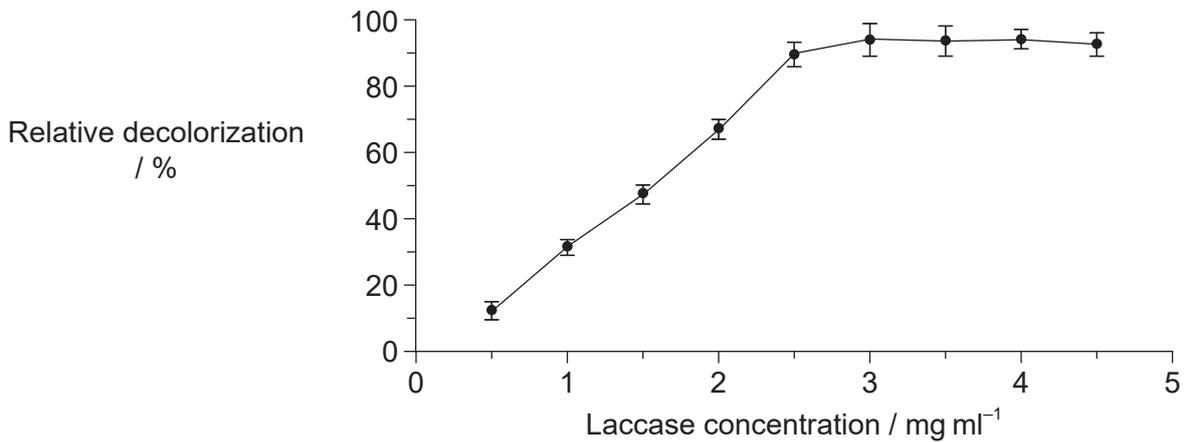
[1]

.....

.....

- 3. Laccase is an enzyme that has the ability to decompose synthetic dyes used in the production of clothing and thus could potentially help reduce synthetic dye pollution.

An experiment was performed in which laccase was immobilized in alginate beads to determine the effectiveness of laccase immobilization in decolorizing the dye crystal violet. The graph shows the effect of laccase concentration on relative decolorization activity of the immobilized laccase. Error bars represent \pm SD.



- (a) Determine the most effective laccase concentration for decolorizing crystal violet.

[1]

.....

- (b) Predict the relative decolorization of crystal violet at an laccase concentration of 5 mg ml⁻¹.

[1]

.....%

(This question continues on the following page)



(Question 3 continued)

- (c) Deduce the significance of overlapping error bars in the data for laccase concentrations from 3 mg ml^{-1} to 4 mg ml^{-1} . [1]

.....

.....

- (d) Describe the relationship between laccase concentration and percent decolorization of crystal violet. [2]

.....

.....

.....

.....

- (e) Discuss the variables that need to be controlled in this investigation. [2]

.....

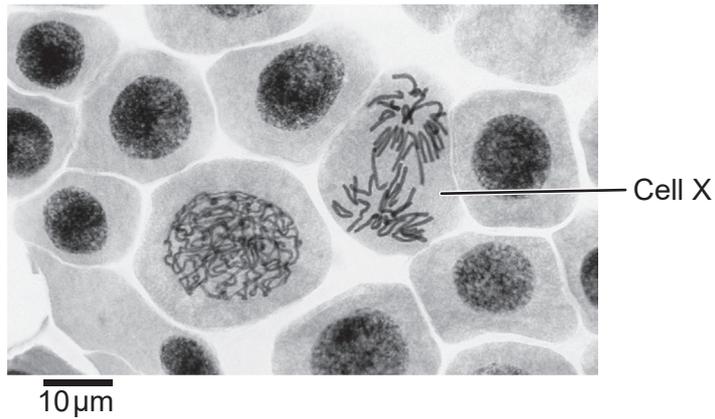
.....

.....

.....



4. The micrograph shows onion (*Allium cepa*) meristematic tissue.



(a) Identify the phase of mitosis occurring in cell X. [1]

.....

(b) Calculate the magnification of the image. [1]

.....

(c) Meiosis is another type of cell division. List **two** structures in which meiosis takes place in a flowering plant such as an onion. [2]

1.

2.

(This question continues on the following page)



(Question 4 continued)

(d) (i) Define pollination.

[1]

.....
.....

(ii) Outline how cross-pollination can be promoted by flowering plants.

[2]

.....
.....
.....
.....



Disclaimer:

Content used in IB assessments is taken from authentic, third-party sources. The views expressed within them belong to their individual authors and/or publishers and do not necessarily reflect the views of the IB.

References:

3. Mogharabi, M., Nassiri, N., Bozorgi-Koushalshahi, M., Nafissi-Varcheh, N., Bagherzadeh, G. and Faramarzi, M., 2012. Immobilization of Laccase in Alginate-Gelatin Mixed Gel and Decolorization of Synthetic Dyes. *Bioinorganic Chemistry and Applications* 2012. <https://doi.org/10.1155/2012/823830>. Source adapted. Licensed under CC BY 3.0 Attribution Unported Deed: <https://creativecommons.org/licenses/by/3.0/deed.en>.
4. Reischig, J., 2014. [*Root meristem of onion*] Available at: [https://commons.wikimedia.org/wiki/File:Mitosis_\(261_14\)_Pressed;_root_meristem_of_onion_\(cells_in_prophase,_anaphase\).jpg](https://commons.wikimedia.org/wiki/File:Mitosis_(261_14)_Pressed;_root_meristem_of_onion_(cells_in_prophase,_anaphase).jpg). Source adapted. This file is licensed under the Creative Commons Attribution-Share Alike 3.0 Unported license: <https://creativecommons.org/licenses/by-sa/3.0/deed.en>.

All other texts, graphics and illustrations © International Baccalaureate Organization 2025



08EP08