

© International Baccalaureate Organization 2026

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 2026

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, 2026

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/>.

Physics
Standard level
Paper 2

29 April 2026

Zone A morning | **Zone B** morning | **Zone C** morning

Session number

1 hour 30 minutes

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

Instructions to students

- 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.
- A clean copy of the **physics data booklet** is required for this paper.
- The maximum mark for this examination paper is **[50 marks]**.



Please **do not** write on this page.

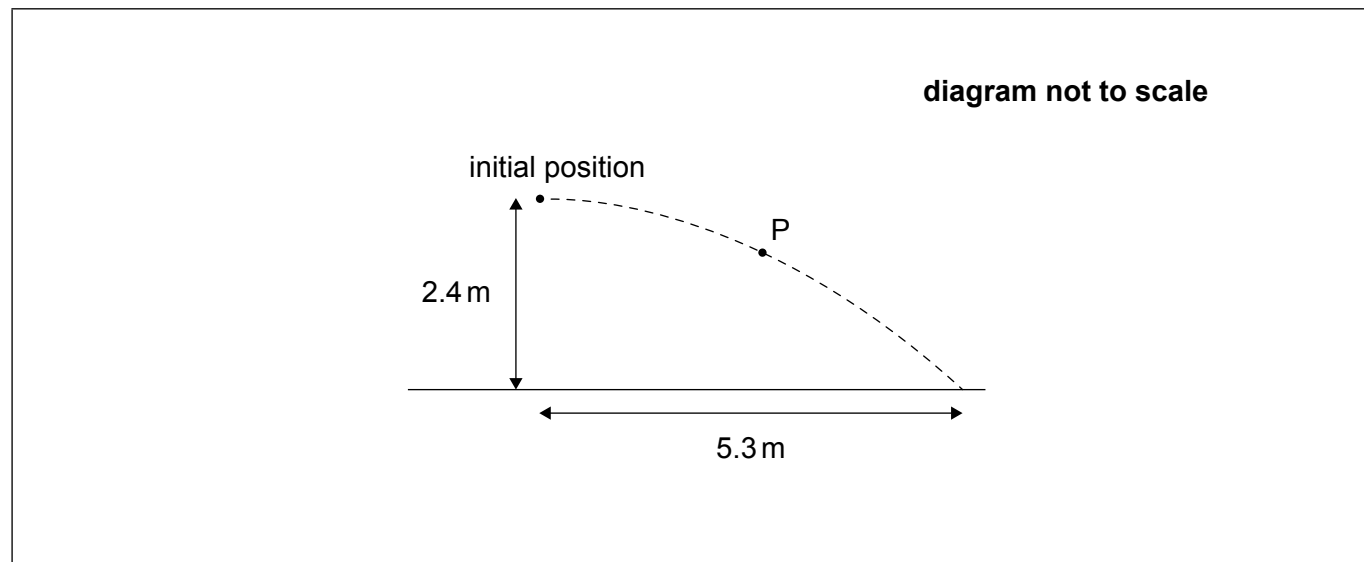
Answers written on this page
will not be marked.



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

1. A ball is thrown horizontally from a height of 2.4 m above the ground. The horizontal distance travelled by the ball is 5.3 m. Air resistance is negligible.

The diagram shows the path of the ball. P is an instantaneous position of the ball.



- (a) Draw, on the diagram, labelled arrows to show

- (i) the velocity v of the ball at P. [1]
- (ii) the acceleration a of the ball at P. [1]

- (b) Calculate

- (i) the time the ball is in the air. [2]

.....

.....

.....

.....

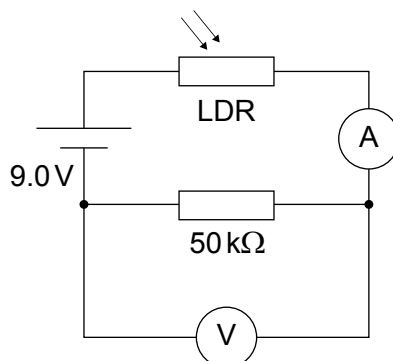
- (ii) the initial speed of the ball. [1]

.....

.....



2. A light-dependent resistor (LDR) and a fixed $50\text{ k}\Omega$ resistor are connected to a cell of emf 9.0 V , as shown.



The ammeter and the voltmeter are ideal. The cell has no internal resistance.

- (a) State what is meant by an ideal ammeter.

[1]

.....

.....

The resistance of the LDR is $200\text{ k}\Omega$ in complete darkness, and it decreases with increasing intensity of incident light.

- (b) Calculate the reading of the ammeter when the LDR is in complete darkness.

[2]

.....

.....

.....

.....

(This question continues on the following page)



(Question 2 continued)

The intensity of light incident on the LDR is increased.

(c) Explain the change, if any, to

(i) the reading of the voltmeter.

[2]

.....

.....

.....

.....

(ii) the power transferred from the cell.

[1]

.....

.....



Please **do not** write on this page.

Answers written on this page
will not be marked.



3. (a) Explain, with reference to energy levels, the formation of the **absorption** spectrum of a gas. [3]

.....

.....

.....

.....

.....

.....

The diagram shows some of the energy levels of an atom.

E_2 _____

E_1 _____

E_0 _____

The wavelengths of photons emitted in some of the atomic transitions between these energy levels are given in the table.

Transition	Wavelength / nm
From E_1 to E_0	514
From E_2 to E_0	309

- (b) Calculate, in eV, the energy difference $E_2 - E_1$. [2]

.....

.....

.....

.....



4. (a) State **one** difference between a red giant star and the Sun. [1]

.....

The following data are given about star X:

$$\text{surface temperature} = 4.5 T_{\odot}$$

$$\text{luminosity} = 0.056 L_{\odot}$$

$$\text{parallax angle} = 0.37 \text{ arc-second}$$

$T_{\odot}$ and $L_{\odot}$ are the surface temperature and luminosity of the Sun respectively.

- (b) (i) State the SI units of luminosity. [1]

.....

- (ii) Calculate, in ly, the distance to star X. [1]

.....

- (iii) Determine the radius of star X in terms of the solar radius $R_{\odot}$. [2]

.....

(This question continues on the following page)



(Question 4 continued)

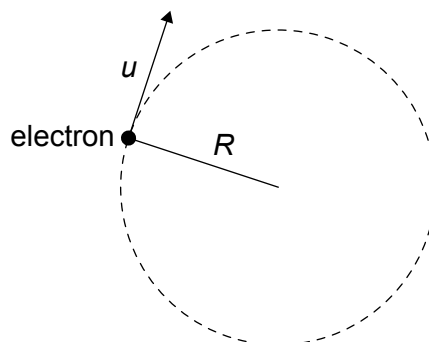
(iv) Suggest the evolutionary stage of star X.

[1]

.....
.....



5. An electron is moving in a uniform magnetic field of strength B . The path of the electron is a circle of radius R . The diagram shows the path of the electron and the direction of the electron's velocity, u , at one instant.



- (a) (i) State the direction of the magnetic field. [1]

.....

- (ii) Outline why the kinetic energy of the electron remains constant. [1]

.....

It is given that $B = 1.5 \text{ mT}$ and $R = 4.0 \text{ cm}$.

- (iii) Determine u . [2]

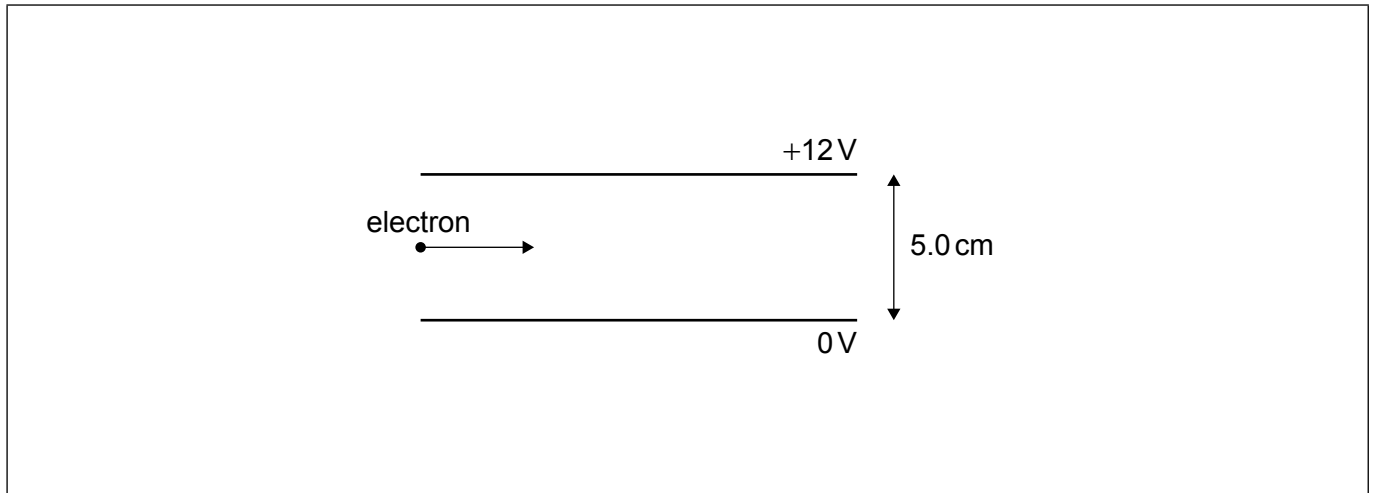
.....

(This question continues on the following page)



(Question 5 continued)

Another electron enters a region of uniform electric field between two horizontal parallel charged plates. The potential difference between the plates is 12 V and their separation is 5.0 cm. The diagram shows the plates and the initial velocity of the electron.



- (b) (i) Deduce, with an appropriate calculation, whether gravitational effects on the motion of the electron are negligible.

[3]

.....

.....

.....

.....

.....

.....

- (ii) Describe the subsequent path of the electron.

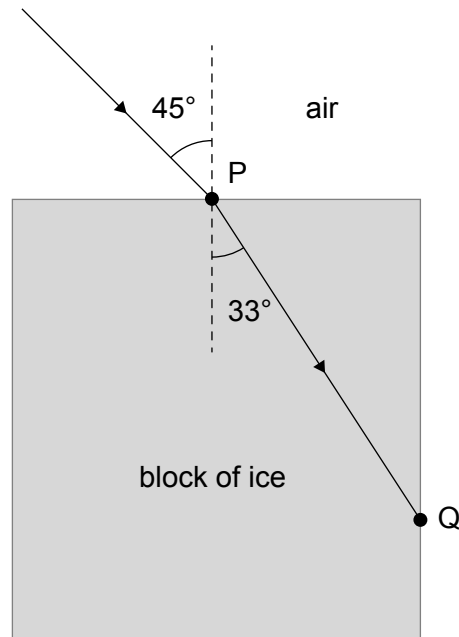
[1]

.....

.....



6. A ray of light enters a rectangular block of ice from the air at point P, as shown. The angle of incidence at P is 45° and the angle of refraction is 33° . The refracted ray is incident on the adjacent ice–air boundary at point Q.



The speed of light in air is c .

(This question continues on the following page)



(Question 6 continued)

- (a) (i) Calculate the speed of light in the ice. [2]

.....

.....

.....

.....

- (ii) State and explain the change in the wavelength of light as it enters the ice from the air. [2]

.....

.....

.....

.....

- (iii) Deduce whether the light will emerge from the block of ice at Q. [3]

.....

.....

.....

.....

.....

.....

(This question continues on the following page)



(Question 6 continued)

The block of ice is then fully submerged in cold water and released from rest.

The following data are given:

$$\text{density of ice} = 920 \text{ kg m}^{-3}$$

$$\text{density of water} = 1000 \text{ kg m}^{-3}$$

- (b) (i) Determine the initial acceleration of the block of ice.

[3]

.....

.....

.....

.....

.....

.....

(This question continues on the following page)



(Question 6 continued)

A drag force acts on the block of ice. The magnitude of the drag force increases with the speed of the block. The block is released from a sufficient depth that it can reach terminal speed.

- (ii) State how the acceleration of the block of ice changes with time. [1]

.....
.....

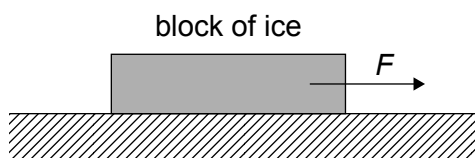
- (iii) Draw, in the box below, a free-body diagram of the forces acting on the block of ice when it is moving at terminal speed. [2]

(This question continues on the following page)



(Question 6 continued)

Another block of ice is pulled across a rough horizontal table by a constant force F . The block moves at a constant speed.



The following data are given:

rate of work done by $F = 3.1 \text{ W}$

speed of the block $= 0.50 \text{ m s}^{-1}$

mass of the block $= 5.5 \text{ kg}$

height of the block $= 8.0 \times 10^{-2} \text{ m}$

contact area of the block and the surface $= 7.5 \times 10^{-2} \text{ m}^2$

thermal conductivity of ice $= 2.3 \text{ W m}^{-1} \text{ K}^{-1}$

(c) Calculate

(i) the magnitude of F .

[1]

(ii) the coefficient of dynamic friction between the block of ice and the table.

[1]

(This question continues on the following page)



(Question 6 continued)

The initial temperature of the block of ice is -8.0°C , which is the same as the temperature of the surrounding air and the table.

- (d) (i) Explain why, as the block of ice is pulled across the table, there will be a temperature gradient through the ice. [2]

.....

.....

.....

.....

- (ii) Estimate the temperature of the bottom surface of the block of ice. Assume that the top surface of the block remains at the temperature of the environment, and that thermal conduction vertically through the ice is the primary route of energy transfer in the system. [2]

.....

.....

.....

.....

- (iii) Suggest one other way in which energy is transferred through conduction in the system. [1]

.....

.....



Disclaimer:

Content used in IB assessments is often 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. Sometimes fictitious companies, products or individuals are included in assessments; any similarities with actual entities are purely coincidental. Any trademarks™ or registered® trademarks included are used for illustrative purposes only, and use does not imply any affiliation with or endorsement by the International Baccalaureate.



20EP18

Please **do not** write on this page.

Answers written on this page
will not be marked.



20EP19

Please **do not** write on this page.

Answers written on this page
will not be marked.



20EP20