

© 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/>.

# Sports, exercise and health science

## Higher level

### Paper 1

29 April 2025

Zone A afternoon | Zone B afternoon | Zone C afternoon

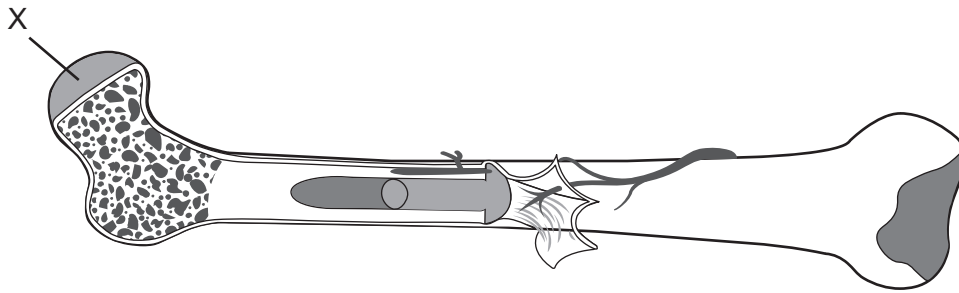
1 hour

---

#### Instructions to candidates

- Do not open this examination paper until instructed to do so.
- Answer all the questions.
- For each question, choose the answer you consider to be the best and indicate your choice on the answer sheet provided.
- The maximum mark for this examination paper is **[40 marks]**.

1. What does X represent?

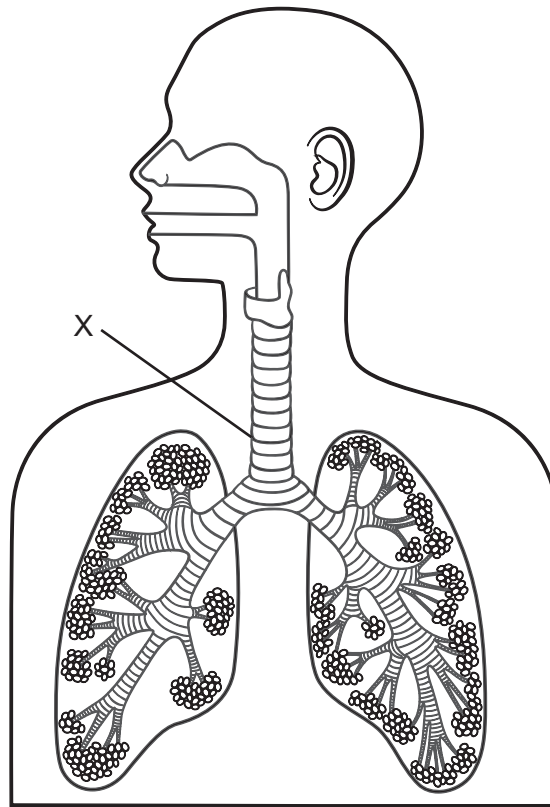


- A. Diaphysis
- B. Spongy bone
- C. Periosteum
- D. Articular cartilage

2. The radius and ulna articulate at the radioulnar joint. What is this type of joint?

- A. Saddle
- B. Pivot
- C. Condyloid
- D. Gliding

3. The diagram shows the ventilatory system. What is labelled X?



- A. Larynx  
B. Trachea  
C. Bronchi  
D. Pharynx
4. Which are carried in the plasma of the blood?
- I. Glucose  
II. Calcium ions  
III. Carbon dioxide
- A. I and II only  
B. I and III only  
C. II and III only  
D. I, II and III

5. What adaptations result from endurance exercise training?

	<b>Left ventricular volume</b>	<b>Resting heart rate</b>	<b>Capillarization</b>
A.	Increases	Increases	Increases
B.	Remains constant	Decreases	Remains constant
C.	Increases	Decreases	Increases
D.	Decreases	Remains constant	Decreases

6. Which are involved in the regulation of heart rate?

- I. Sinoatrial (SA) node
- II. Adrenaline
- III. Autonomic nervous system

- A. I and II only
- B. I and III only
- C. II and III only
- D. I, II and III

7. Which describes pulmonary and systemic circulation?

	<b>Pulmonary</b>	<b>Systemic</b>
A.	Deoxygenated blood to the heart	Deoxygenated blood to the muscles
B.	Oxygenated blood to the heart	Deoxygenated blood from the muscles
C.	Oxygenated blood to the muscles	Deoxygenated blood to the heart
D.	Deoxygenated blood to the muscles	Oxygenated blood from the heart

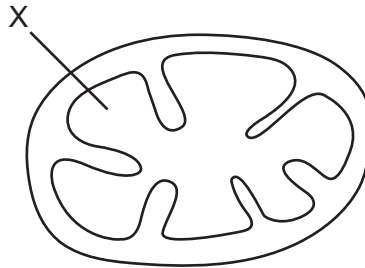
8. Which describes unsaturated fats?

	<b>Bonds</b>	<b>Example</b>
A.	No double bonds	Olive oil
B.	One or more double bonds	Peanuts
C.	No double bonds	Avocado
D.	One or more double bonds	Coconut oil

9. What is a function of glucagon?

- A. Aids in short-term energy storage
- B. Aids in the storage of glucose in liver cells
- C. Stimulates the breakdown of glycogen
- D. Decreases blood glucose levels

10. The diagram shows a mitochondrion. What is labelled X?

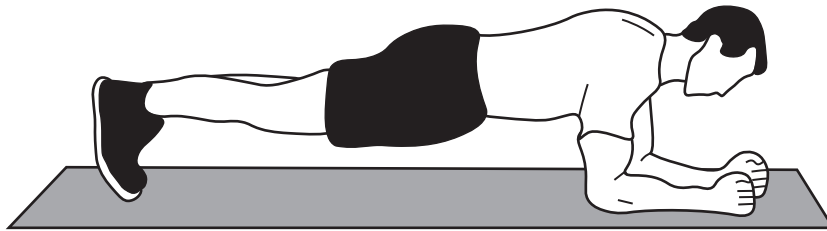


- A. Matrix
- B. Cristae
- C. Outer membrane
- D. Inner membrane

11. Which represents the lactic acid system?

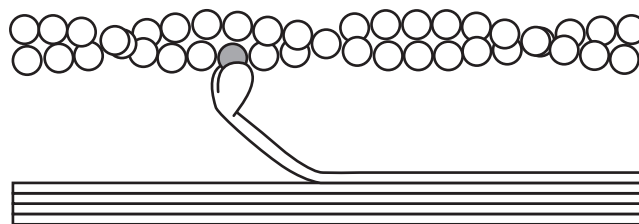
	Substrate	Process	Product
A.	Glucose	Aerobic	36 ATP
B.	Creatine phosphate (CP)	Aerobic	1 ADP + P <sub>i</sub>
C.	Glucose	Anaerobic	2 ATP
D.	Phosphocreatine	Anaerobic	1 ATP

12. The diagram shows an athlete in the plank pose. What type of muscle contraction occurs at the abdominus rectus?



- A. Isometric
- B. Concentric
- C. Eccentric
- D. Isokinetic

13. The diagram shows the crossbridge formation. Which is required for detachment?

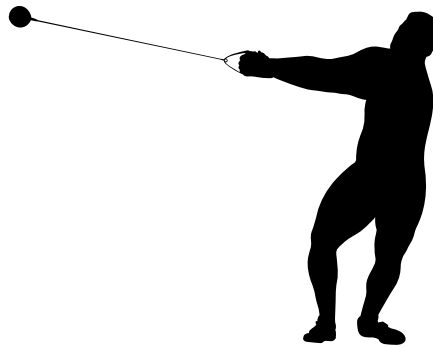


- A. ATP
- B. Ca<sup>+2</sup>
- C. Na<sup>+2</sup>
- D. ADP + P<sub>i</sub>

14. Which is a factor in delayed onset muscle soreness (DOMS)?

- A. Lactic acid accumulation
- B. Concentric muscle contractions
- C. Inflammation of fibres
- D. Low-intensity exercises

15. The diagram shows an athlete performing the hammer throw. Which would increase angular momentum?

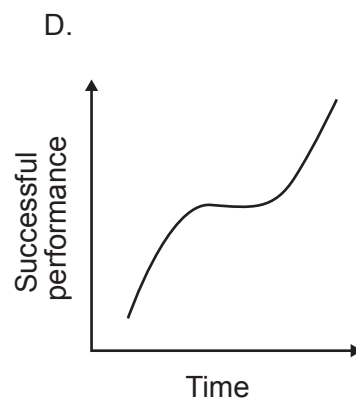
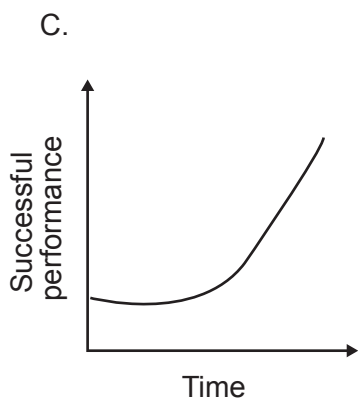
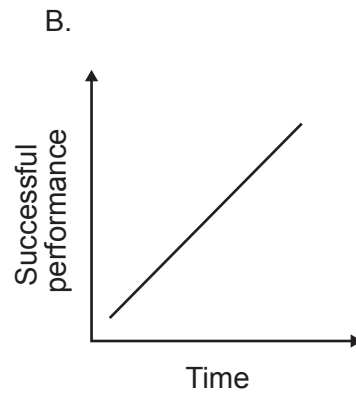
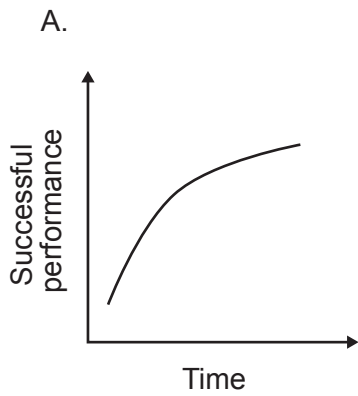


- A. Decreasing the mass of the ball
- B. Increasing the length of the wire
- C. Decreasing the velocity of rotation
- D. Increasing the thickness of the wire

16. The diagram shows a swimmer on the starting block at the beginning of a race. Which muscle acts as the agonist in the left leg during the push off?



- A. Gastrocnemius
  - B. Tibialis anterior
  - C. Biceps femoris
  - D. Semitendinosus
17. Which graph shows a negatively accelerated learning curve?



18. What is a skill?
- A. A way in which a movement is performed
  - B. A change in performance over time
  - C. The consistent production of goal-oriented movements, which are learned and specific to the task
  - D. A general trait or capacity of the individual that is related to the performance of a task
19. Which are characteristics of short-term memory?
- I. Short duration (approximately 10 seconds)
  - II. Limited capacity ( $7 \pm 2$  bits of information)
  - III. Information is retrieved the following day
- A. I and II only
  - B. I and III only
  - C. II and III only
  - D. I, II and III
20. Which is an example of the associative stage of learning?
- A. A gymnast detects and self-corrects movements on a balance beam without external feedback.
  - B. A soccer (football) player talks through the steps of a throw-in as they attempt the skill.
  - C. A tennis player detects movement of a serve and receives some feedback from a coach.
  - D. A basketball player consistently dribbles and evaluates the movement of opponents.

21. Results from an investigation found a direct relationship between the number of choices and an athlete's speed of reaction. What is this called?
- A. Psychological refractory period (PRP)
  - B. Hick's Law
  - C. Selective attention (SA)
  - D. Welford's model
22. Which components of fitness can be applied to the examples to enhance performance?

	<b>Example</b>	<b>Components of fitness</b>
A.	An athlete performing a 60 m indoor sprint	Agility, reaction time, power
B.	A gymnast performing a single vault	Agility, reaction time, flexibility
C.	A soccer (football) goalkeeper making a save	Agility, reaction time, flexibility
D.	A swimmer competing in an 800 m race	Agility, cardiovascular endurance, flexibility

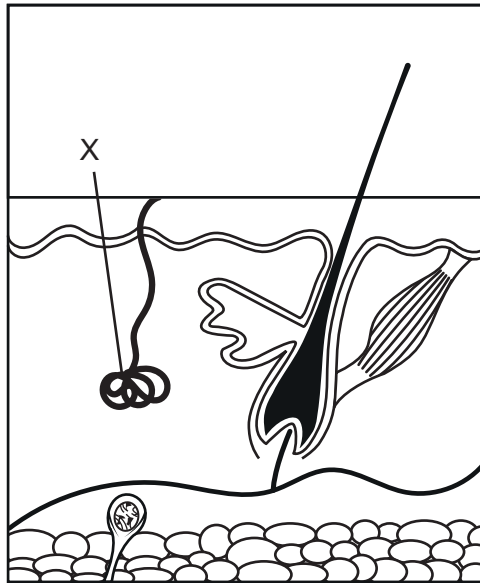
23. What does the *t*-test indicate about dominant and non-dominant hand grip strength?

	<b>Hand grip strength/ N ± 0.5</b>	
	Dominant hand	Non-dominant hand
<b>Mean</b>	338.5	342.5
<b>SD</b>	47.9	44.6
<b>P-value</b>	0.06	

- A. There is a significant difference.
- B. There is a larger range of values in the dominant hand.
- C. There is no significant difference.
- D. There is an overlap of 0.06 N.

24. At the first training session on court, a basketball coach uses the vertical jump test to determine leg power of athletes. What category of test does this represent?
- A. Field test
  - B. Submaximal test
  - C. Laboratory test
  - D. Double-blind test
25. The warm-up is an essential element of a general training programme. Which are benefits of a warm-up?
- I. Increases the respiration rate
  - II. Lowers heart rate
  - III. Reduces muscle soreness
- A. I and II only
  - B. I and III only
  - C. II and III only
  - D. I, II and III

26. What is labelled X on the diagram of the skin?

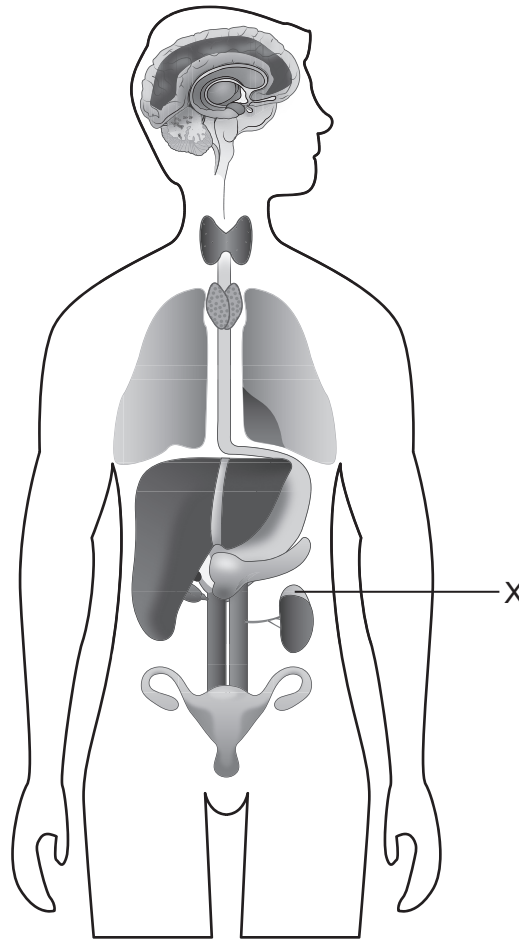


- A. Gland
- B. Hair follicle
- C. Fat
- D. Dermis

27. What is the main fuel source of energy for the brain?

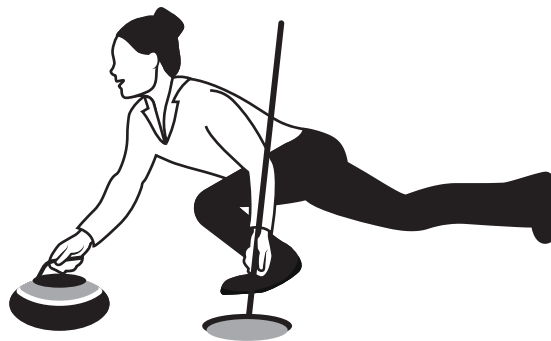
- A. Fat
- B. Glucose
- C. ATP
- D. Protein

28. What endocrine gland does X represent?



- A. Thyroid
  - B. Adrenal
  - C. Ovaries
  - D. Pineal
29. Which hormones are released by the pancreas?
- A. Glucagon and adrenaline
  - B. Glucagon and insulin
  - C. GHRH and insulin
  - D. GHRH and adrenaline

30. What is the definition of fatigue?
- A. A decline in arousal levels during performance
  - B. A reversible, exercise-induced decline in performance
  - C. A negative emotional state associated with performance
  - D. A temporary depletion in energy sources during athletic performance
31. A weightlifter is unable to complete the final repetitions of the bench press exercise due to a reduction in muscle cell force. What condition is the athlete experiencing?
- A. Dehydration
  - B. Peripheral fatigue
  - C. Reversibility
  - D. Central fatigue
32. In the sport of curling, the stone has a smooth outer ring that is in contact with the ice. Which applies as the stone moves across the ice?



- A. The coefficient of dynamic friction
- B. The coefficient of static friction
- C. The coefficient of dynamic drag
- D. The coefficient of static drag

33. Which force, labelled X, is acting on the athlete?



- A. Air resistance
- B. Body weight
- C. Friction
- D. Ground reaction

34. What type of notation system in the table below is used for a lacrosse game?

Player #	Goals	Assists	Ground balls	Turnovers
10	I		II	
17		II		I
20	III	I		
9		I	IIII	

- A. Scattergram
- B. Sequential system
- C. Frequency table
- D. Flow chart

- 35.** Which is a feature of a phase analysis model of qualitative biomechanical analysis?
- A. Uses a hierarchical organization to look at performance
  - B. Focuses on mechanical relationships
  - C. Focuses on movement principles
  - D. A notational system to assess frequency of movement
- 36.** Which is a characteristic of traditional linear pedagogy?
- A. Athlete-led learning
  - B. Coach-led learning
  - C. Process-orientated learning
  - D. Coach-athlete collaborative learning
- 37.** What contains the information for a specific human trait?
- A. DNA
  - B. Genes
  - C. Chromosomes
  - D. Gametes
- 38.** Which human characteristic is influenced by the environment?
- A. Eye colour
  - B. Gender
  - C.  $VO_2$ max
  - D. Blood type

- 39.** Which strategy would minimize a wrestler's risk of infection after a match?
- A. Train regularly with limited recovery
  - B. Take a shower
  - C. Eat a low-fat diet
  - D. Increase contact with others
- 40.** What makes sedentary people less susceptible to infection than elite athletes?
- A. They have increased inflammation due to muscle damage
  - B. They have increased cortisol due to the stress of exercise
  - C. They have greater exposure to airborne bacteria due to poor health
  - D. They have higher leucocyte numbers due to less stress on the body
-

**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. Fokina, N., n.d. *Human respiratory system-01 - stock illustration*. [image online] Available at: <https://www.gettyimages.co.uk/detail/illustration/human-respiratory-system-01-royalty-free-illustration/1326845169?adppopup=true> [Accessed 21 April 2023]. Source adapted.
10. Bionet, 2020. [https://commons.wikimedia.org/wiki/File:Schema\\_mitochondrion\\_basic.svg](https://commons.wikimedia.org/wiki/File:Schema_mitochondrion_basic.svg). Licensed under CC BY-SA 4.0 International Deed: <https://creativecommons.org/licenses/by-sa/4.0/deed.en>.
13. DataBase Center for Life Science (DBCLS). [https://commons.wikimedia.org/w/index.php?title=File:202107\\_Mechanism\\_of\\_skeletal\\_muscle\\_contraction.svg&oldid=762191726](https://commons.wikimedia.org/w/index.php?title=File:202107_Mechanism_of_skeletal_muscle_contraction.svg&oldid=762191726). Licensed under CC BY 4.0 Deed: <https://creativecommons.org/licenses/by/4.0/deed.en>.
16. aurielaki, 2016. *Swimming Freestyle Athlete Isometric Backstroke Sport International Butterfly Swimmer Competition - stock illustration*. [image online] Available at: <https://www.gettyimages.co.uk/detail/illustration/swimming-freestyle-athlete-isometric-royalty-free-illustration/537544696> [Accessed 4 June 2024]. Source adapted.
28. EPA, n.d. *What is the endocrine system?* [image online] Available at: <https://www.epa.gov/endocrine-disruption/what-endocrine-system> [Accessed 20 May 2020]. Source adapted.
32. Godruma, 2017. *Woman play curling vector illustration isolated on white background. - stock illustration*. [image online] Available at: <https://www.gettyimages.co.uk/detail/illustration/woman-play-curling-vector-illustration-royalty-free-illustration/687566940?phrase=curling+sport&adppopup=true> [Accessed 3 July 2024]. Source adapted.