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Sports, exercise and health science
Standard level
Paper 2

30 April 2025

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

Candidate session number

1 hour 15 minutes

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Instructions to candidates

- Write your session number in the boxes above.
- Do not open this examination paper until instructed to do so.
- Section A: answer all questions.
- Section B: answer one question.
- Answers must be written within the answer boxes provided.
- A calculator 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.



Section A

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

1. A study investigated the effect of an 8-week static stretching programme on maximum strength. Participants were placed into two groups.

- Intervention group (IG): Static stretching 15 minutes per day
- Control group (CG): No stretching routine

The following were tested:

- Isometric strength (ISO)
- Dynamic one-repetition maximum (1RM)
- Shoulder range of motion (ROM).

Measurements were recorded pre- and post-training and are presented in the table below.

Group	Test	Pre-training mean (±SD)	Post-training mean (±SD)
Intervention group (IG)	1RM (kg)	75.25 (33.62)	79.69 (34.0)
	ISO (N)	649.99 (337.07)	685.53 (325.11)
	ROM (cm)	54.61 (9.05)	49.28 (8.7)
Control group (CG)	1RM (kg)	68.65 (25.76)	69.19 (26.11)
	ISO (N)	600.50 (251.37)	643.61 (241.67)
	ROM (cm)	50.00 (5.34)	49.69 (5.7)

(a) Identify the group with the lower pre-training ISO mean. [1]

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(b) Determine the percentage change in the 1RM mean from pre-training to post-training for the intervention group. [2]

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Turn over

(Question 1 continued)

The data from the investigation was made into a series of graphs. The graphs for 1RM, ISO and ROM are presented in **Figure 1**.

Figure 1: (a) 1RM, (b) ISO, and (c) ROM

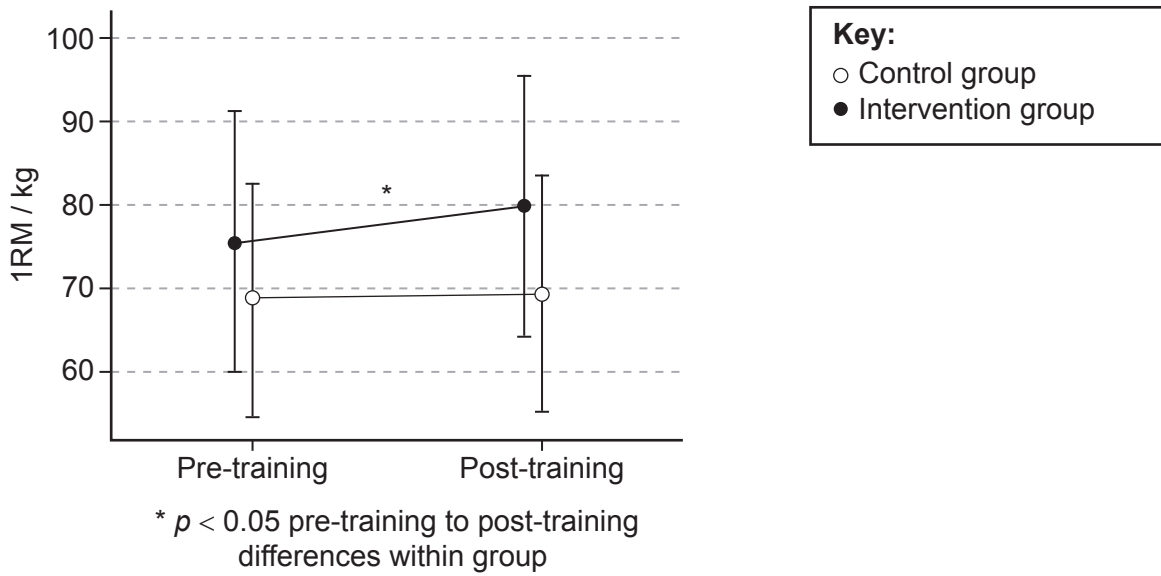


Figure 1(a)

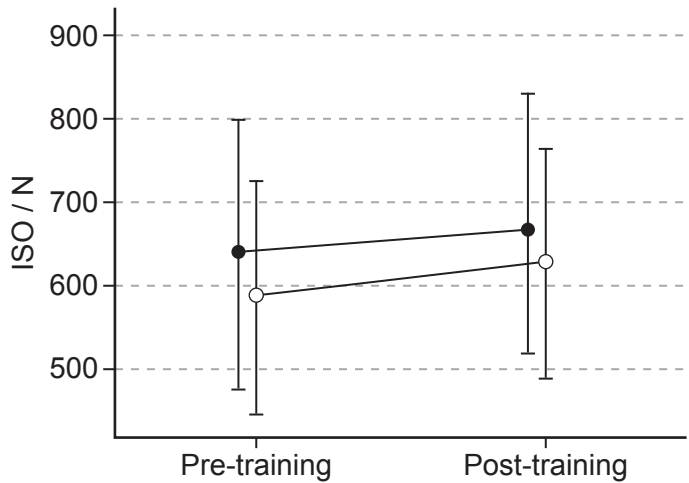


Figure 1(b)

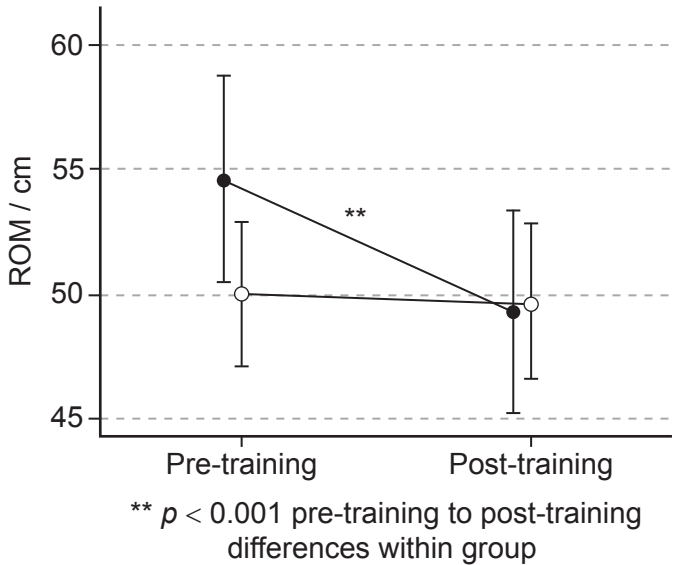


Figure 1(c)

(c) Outline the use of error bars in **Figure 1(a)**, **Figure 1(b)** and **Figure 1(c)**.

[1]

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(Question 1 continued)

- (d) With reference to **Figure 1(c)**, compare and contrast the reliability of the results for ROM for the control and intervention groups. [2]

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- (e) Using **Figure 1**, comment on the impact of an 8-week static stretching programme on strength and flexibility. [3]

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2. Protein is an important macronutrient required to support strength training.

(a) List the chemical composition of protein. [1]

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(b) Outline the importance of essential amino acids to an individual's health. [1]

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(c) Protein is essential for the production of blood cells. Outline the functions of the **three** types of cells that form blood. [3]

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3. A coach is coaching a performer to play tennis.

(a) Define the concept of *transfer*.

[1]

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(b) Outline abilities to skills as a type of transfer when learning to return the ball in tennis.

[1]

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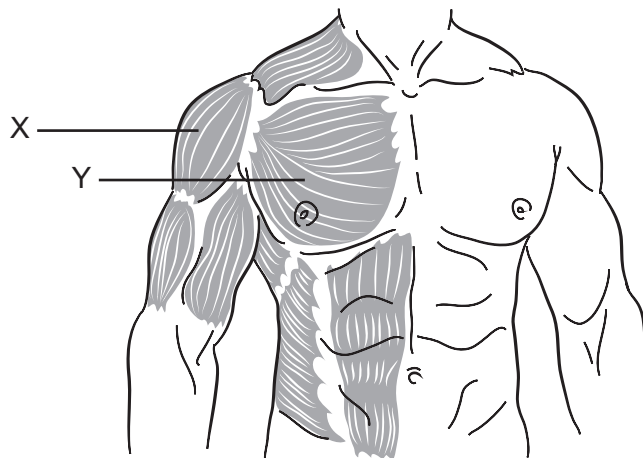
(c) Outline **one** type of practice that may be used in tennis.

[1]

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.....

(d) Identify the muscles labelled X and Y.

[2]



X:
Y:

(This question continues on the following page)



(Question 3 continued)

Figure 2: A tennis player serving the ball during a match



(e) Analyse the movement occurring at the elbow labelled X in **Figure 2** as the tennis player stretches to serve.

[4]

Joint	Joint action	Agonist	Contraction type of agonist	Antagonist
Elbow



4. (a) Outline how ATP is catabolised to provide energy for muscular contraction. [2]

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- (b) Outline **two** performance-related fitness components that are used during a 100m sprint. [2]

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- (c) Explain how selective attention (SA) contributes to a sprinter's improved start time and overall performance in a race. [3]

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Section B

Answer **one** question. Answers must be written within the answer boxes provided.

5. (a) Outline **four** features of a synovial joint. [4]
- (b) Explain the mechanism of expiration (exhalation) when exercising. [5]
- (c) Using examples from sport, describe **both** open-loop and closed-loop motor programmes. [6]
- (d) Discuss the recommended macronutrients required for marathon running. [5]
6. (a) Explain how the sarcomere of the skeletal muscle shortens after calcium ions are released from the sarcoplasmic reticulum. [5]
- (b) Describe how blood is redistributed during exercise. [5]
- (c) Outline **five** characteristics common to muscle tissue. [5]
- (d) Analyse the concept of the psychological refractory period (PRP). [5]
7. (a) Periodization can be used to optimize an athlete's development. Analyse how a coach uses the **other** key principles of training to enhance performance. [5]
- (b) Describe **five** cardiovascular adaptations resulting from marathon training. [5]
- (c) Discuss the factors that influence the dominant energy system used during exercise. [5]
- (d) Describe Bernoulli's principle as a tennis ball is hit with topspin. [5]



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16EP12

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16EP13

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References:

1. Warneke, et al., 2023. Effects of a Home-Based Stretching Program on Bench Press Maximum Strength and Shoulder Flexibility. *Journal of Sports Science and Medicine*, 22, pp. 597–604. Source adapted.
- 3.(d) Kabanova, V., 2021. *Mens body arms shoulders chest and abs. – stock illustration*. [image online] Available at: <https://www.gettyimages.co.uk/detail/illustration/men-s-body-arms-shoulders-chest-and-abs-royalty-free-illustration/1359361226?adppopup=true> [Accessed 5 July 2024]. Source adapted.
- 3.(e) AnnaSqBerg, 2016. *Disabled Athlete On Wheelchair Play Tennis Sport Competition Vector - stock illustration*. [image online] Available at: <https://www.gettyimages.co.uk/detail/illustration/disabled-athlete-on-wheelchair-play-tennis-royalty-free-illustration/583809218?adppopup=true> [Accessed 5 July 2024]. Source adapted.



16EP16