Diploma Programme
Programme du diplôme
Programa del Diploma

Sports, exercise and health science
Higher level
Paper 2

30 April 2025

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

Candidate session number

2 hours 15 minutes

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 two questions.
- Answers must be written within the answer boxes provided.
- A calculator is required for this paper.
- The maximum mark for this examination paper is **[90 marks]**.

2225 – 6808

21 pages

Section A

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

1. A study examined effects of exercise on long-term memory. Participants were presented with a list of words before or after exercise. Recall of the list of words was measured twice: 60 minutes and 24 hours after being presented with the words. Participants were randomly assigned to one of three groups:

- Control group
- Words presented before exercise group
- Words presented after exercise group.

The table shows the mean and standard deviation (SD) of the correct recall count of the words for the three groups.

Group	60-minute recall count (SD)	24-hour recall count (SD)
Control	4.93 (2.66)	4.21 (2.58)
Words presented before exercise	7.53 (2.90)	6.57 (3.08)
Words presented after exercise	6.00 (2.90)	4.64 (2.56)

(This question continues on the following page)

(Question 1 continued)

(a) (i) Identify the group and condition with the lowest mean recall count. [1]

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(ii) Calculate the difference between the standard deviation values for the words before exercise and words after exercise groups during the 60-minute recall count. [1]

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(iii) Using the data, analyse the standard deviations for the words before exercise and words after exercise groups during the 60-minute recall count. [2]

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(b) Outline the characteristics of long-term memory. [3]

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will not be marked.

(Question 1 continued)

(c) (i) Define *selective attention* (*SA*). [1]

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(ii) Discuss how memory and selective attention (SA) interact in the cognitive phase of learning a skill. [2]

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(iii) Discuss how rehearsal when memorizing a word list may have affected the data in this study. [2]

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(Question 1 continued)

A study examined changes in maximal cardiac output in response to high-intensity interval training (HIIT). Participants were divided into two groups:

- control group – performed no exercise
- test group – performed HIIT.

The table shows the mean results for the control and test groups measured at baseline and post-treatment.

	Cardiac output / litres min^{-1}	
	Control group	HIIT group
Baseline / litres min^{-1}	20.8	20.8
Post-treatment / litres min^{-1}	20.5	22.1

(This question continues on the following page)

(Question 1 continued)

(d) (i) State the mean post-treatment cardiac output for the HIIT group. [1]

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(ii) Describe cardiac output. [2]

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2. (a) Characteristics of muscle tissue include being controlled by nerve stimuli and fed by capillaries. Outline **four** other general characteristics common to muscle tissue. [4]

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(b) Discuss the variability in VO_2 max in trained and untrained individuals. [2]

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(c) Identify **one** effect on the immune system of training for a marathon. [1]

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(Question 2 continued)

(d) Using sporting examples, discuss the contribution of genetic factors to potential success. [3]

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(e) List implications of genetic screening for sport, exercise and health. [3]

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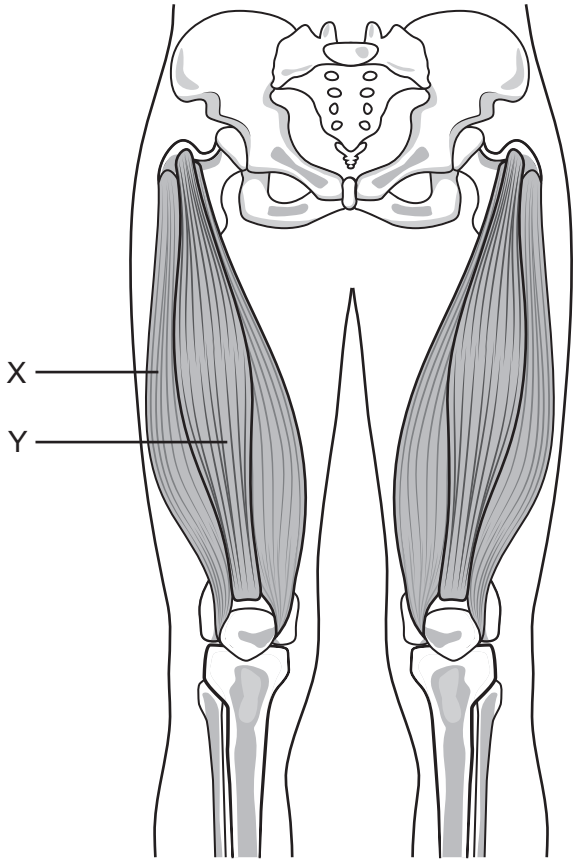
3. (a) The diagram shows the skeletal muscles in the anterior upper leg. Identify the parts labelled X and Y. [2]



X: . . . . . .

Y: . . . . . .

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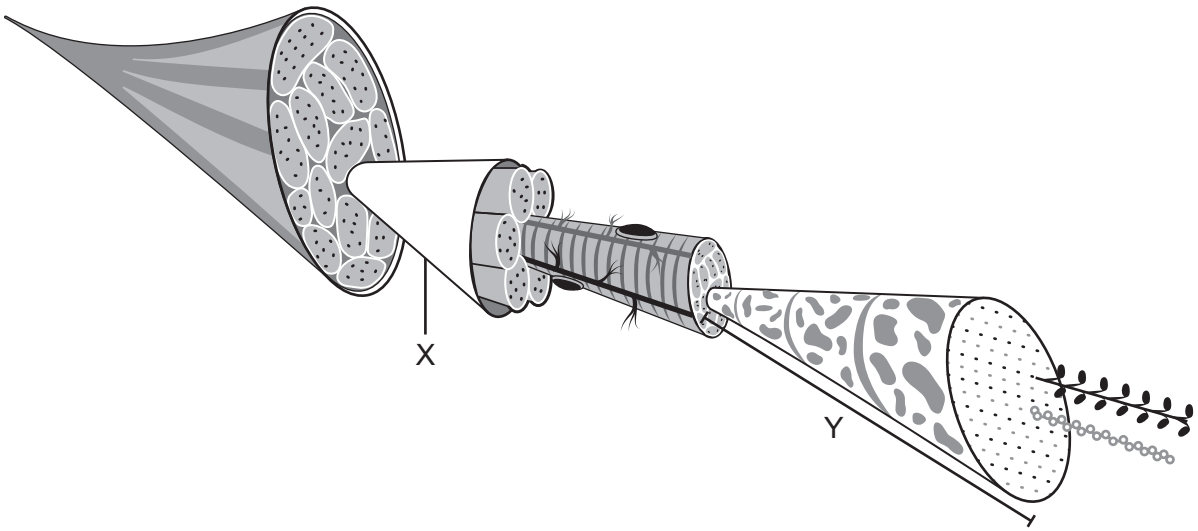
(Question 3 continued)

(b) The diagram shows skeletal muscle. Identify the parts labelled X and Y. [2]



X: . . . . . .

Y: . . . . . .

(c) Discuss characteristics of a type IIb fast glycolytic muscle fibre. [4]

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(Question 3 continued)

(d) Explain the role of insulin in the formation of glycogen. [3]

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4. (a) Describe how friction influences a 100 m sprinter's performance. [3]

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(b) Outline **two** environmental constraints that can enhance a sprinter's learning of a new skill. [2]

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(c) Sketch a flow chart with features that can be used for match analysis in a team invasion game of choice. [3]

(This question continues on the following page)

(Question 4 continued)

(d) Using examples, explain **three** ways a coach may use a constraints-led approach to improve player motivation. [3]

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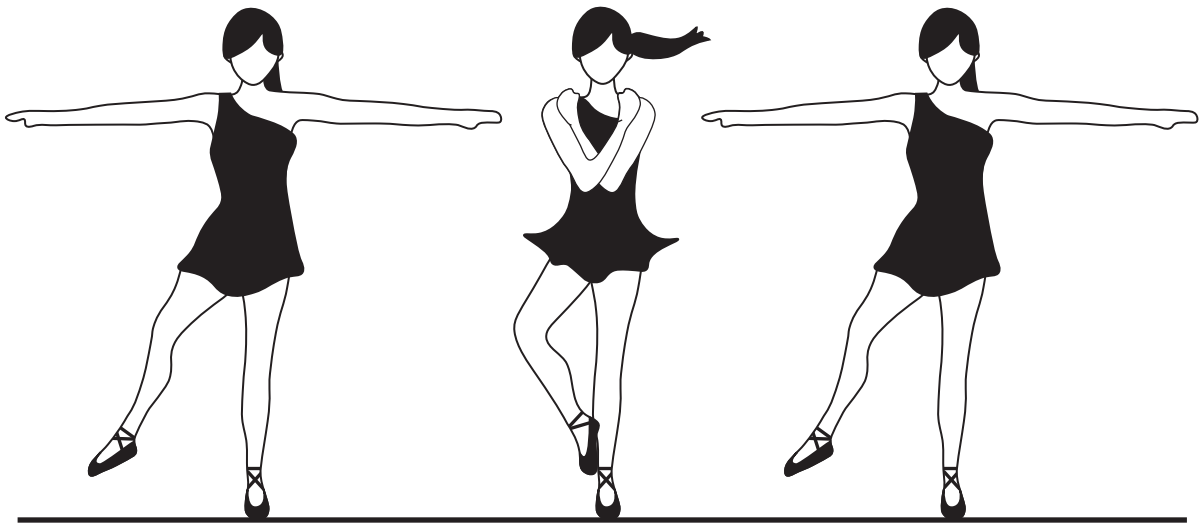
Section B

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

5. (a) Describe the process of gaseous exchange at the alveoli during rest and exercise. [6]

(b) The diagram shows a person performing a pirouette in ballet.



Explain the concept of angular momentum when the ballet dancer performs the pirouette. [6]

(c) The hypothalamus controls the pituitary gland via neurohormones and nerve impulses. With reference to specific hormones, explain the mechanism and effect of these signals on the pituitary gland. [4]

(d) Outline **two** types of drag that can occur in swimming. [4]

6. (a) Periodization and progression can be used to optimize an athlete's performance. Explain how a coach uses the **other** key principles of training to maximize athletic development. [4]

(b) Outline **six** structures in an animal cell. [6]

(c) Running during a soccer (football) game and throwing a dart are examples of motor skills that can be classified into various continua. Using these examples, analyse the use of muscle mass and precision, and environmental impact on the skill continua. [4]

(d) Explain the features and functions of the diencephalon. [6]

7. (a) Evaluate **two** valid field tests of aerobic capacity. [6]

(b) Using examples, outline Newton's three laws of motion during a soccer (football) match. [6]

(c) Discuss how hormone levels are regulated. [4]

(d) Outline how the body responds when an athlete's skin is exposed to injury or infection. [4]

8. (a) Explain different methods of presentation when teaching a skill. [4]

(b) Describe the re-synthesis of ATP by the ATP–CP system. [4]

(c) Describe the mechanics of ventilation during high-intensity interval training. [6]

(d) Distinguish between high-intensity and endurance activities. [6]

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References:

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