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Sports, exercise and health science
Standard level
Paper 2

8 November 2024

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]**.



Section A

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

1. A study monitored the physical fitness of elite basketball players at three assessment points throughout a year. The assessments took place:

Before preparation: At the beginning of the fitness training (preparation) programme.

After preparation: At the end of the fitness training (preparation) programme at the start of the competitive season.

Mid-competitive season: Halfway through the competitive season.

Blood lactate values during a 5-minute high-intensity intermittent test (m.mol.L^{-1}), vertical jump height (cm) and body fat percentage were collected at the three assessment points. The data is presented in the table below.

	Before preparation	After preparation	Mid-competitive season
Test	Mean (SD +/-)	Mean (SD +/-)	Mean (SD +/-)
High-intensity intermittent test (blood lactate m.mol.L^{-1})	5.3 (2.6)	3.9 (1.4)	3.3 (1.5)
Vertical jump (cm)	46.9 (4.4)	46.1 (5.6)	47.2 (5.6)
Body fat (%)	13.3 (4.1)	12.3 (4.1)	12.1 (3.7)

- (a) Identify the assessment point with the highest mean vertical jump (cm). [1]

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- (b) Calculate the change in body fat (%) from before preparation to mid-competitive season. [1]

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(This question continues on the following page)



(Question 1 continued)

(c) Explain why the vertical jump test is specific to a basketball player. [3]

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(d) Identify **two** further performance-related components of fitness that investigators could use to assess the fitness of the basketball players. [2]

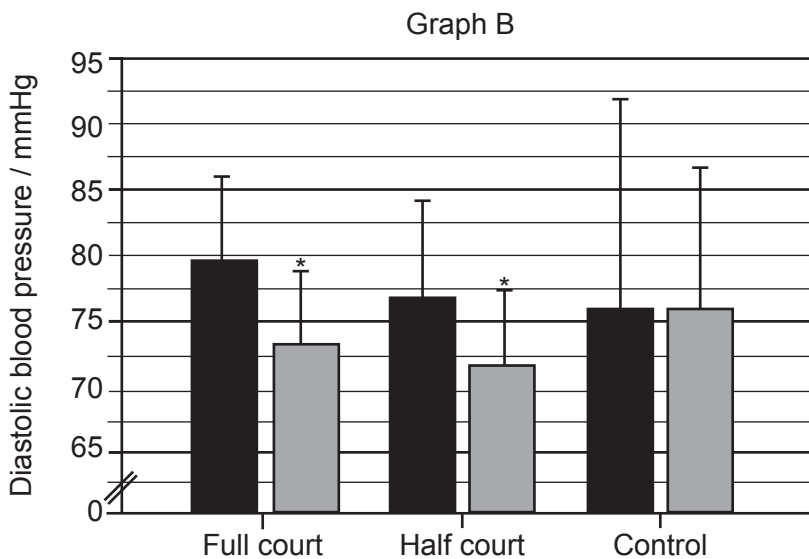
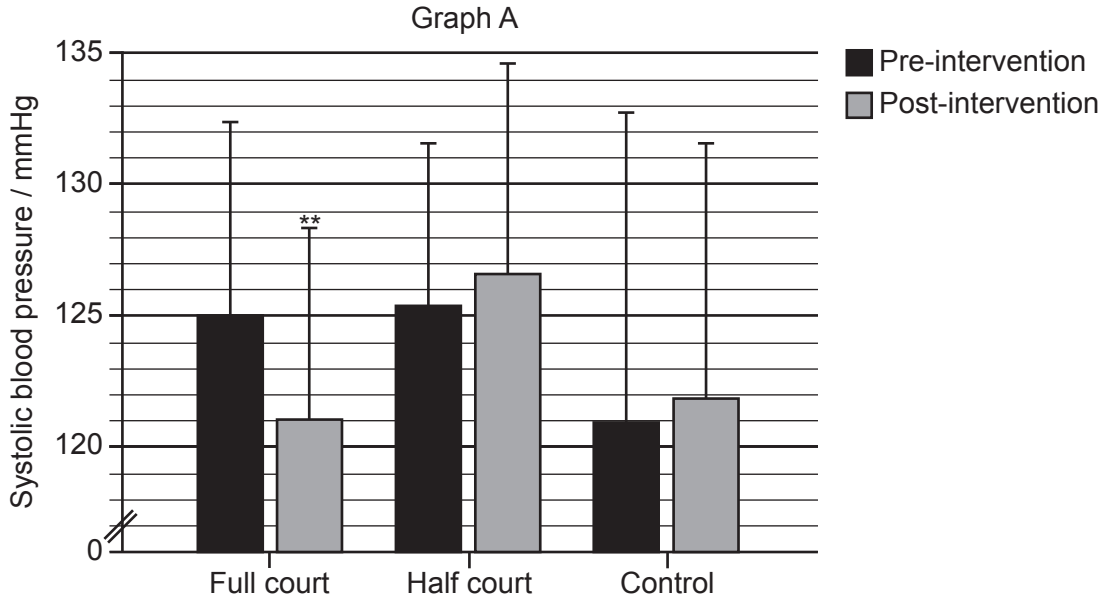
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2. A second study explored the effects of different basketball practice intensities on the blood pressure of untrained individuals.

Participants' systolic and diastolic blood pressures were recorded both at the beginning (pre-intervention) and after 12 weeks (post-intervention) of engaging in one of three conditions: full-court practice, half-court practice, or no practice (control).



* $p < 0.05$ in comparison with pre-intervention
** $p < 0.05$ in comparison with change to the control

- (a) Identify the condition and intervention with the largest systolic blood pressure.

[1]

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(Question 2 continued)

(b) State what error bars represent on the graphs. [1]

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(c) Discuss the effect of the 12-week practice on blood pressure. [3]

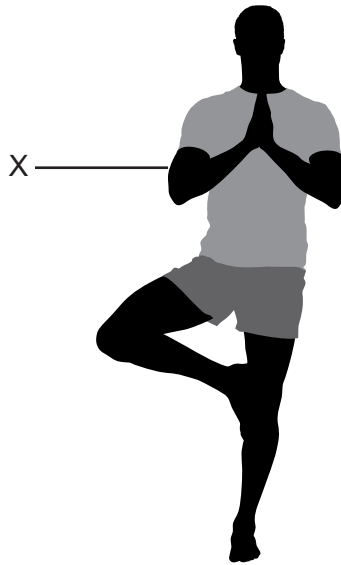
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(d) Predict the effect of static exercise on systolic and diastolic blood pressure. [2]

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3. (a) State the muscle labelled X. [1]



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- (b) Distinguish between the movement permitted at a synovial joint, such as the shoulder, and a cartilaginous joint found in the vertebrae. [1]

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- (c) Identify **two** characteristics of skeletal muscle. [2]

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(This question continues on the following page)



(Question 3 continued)

(d) Evaluate the stork stand test for assessing balance.

[3]

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(e) Synovial fluid and bursae provide lubrication and a cushion between bones and tendons. Outline the function of **three** other components of a synovial joint.

[3]

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4. (a) State **one** major site of triglyceride storage. [1]

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(b) Outline the process of lipolysis during endurance cycling. [2]

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(c) Explain the effect of starting an endurance cycle on the exchange of oxygen at the lungs. [3]

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Section B

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

5. (a) Outline **five** cardiovascular adaptations from marathon training. [5]
- (b) Distinguish between a tennis ball struck with top spin and a ball struck with back spin, referring to local airflow velocity around the ball, local airflow pressure and the flight path of the ball. [4]
- (c) Explain rehearsal and chunking as methods to improve memory. [4]
- (d) The individual differences of coaching and teaching environments can affect the rate of learning. Discuss **three** other factors that affect an individual's rate of learning a new skill. [3]
- (e) Explain the role of muscle contraction on glucose uptake during exercise. [4]
6. (a) Distinguish between running a marathon and a diver completing a somersault routine from a platform, using the classification of skill continua. [3]
- (b) Compare and contrast the optimum macronutrient intake of a marathon runner to a sedentary individual of the same age. [5]
- (c) Explain how contraction of the diaphragm and external intercostal muscles leads to inhalation of the lungs during exercise. [5]
- (d) Using examples, outline concentric and eccentric muscle contractions. [4]
- (e) Describe the predominant energy system responsible for producing adenosine triphosphate (ATP) during a 50 second 400 m race. [3]
7. (a) Describe the sequence of excitation of the heart muscle during exercise. [4]
- (b) Evaluate the use of laboratory testing to assess performance of athletes. [3]
- (c) Explain how an athlete can change their body position to become more stable. [3]
- (d) Distinguish **six** differences between a skilled and novice performer. [6]
- (e) Evaluate the function of fast twitch (type IIb) muscle fibres. [4]



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16EP10

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16EP11

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16EP12

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16EP13

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References:

2. Randers, M.B. et al., 2018. Effects of 3 months of full-court and half-court street basketball training on health profile in untrained men. *Journal of Sport and Health Science*, [online] 7(2), pp. 132–138. Available at: <https://www.sciencedirect.com/science/article/pii/S209525461730114X#fig0020> [Accessed 5 February 2024]. Source adapted.
3. 4x6, n.d. *Multiple images of a man exercising*, [image online] Available at: <https://www.gettyimages.ca/detail/illustration/multiple-images-of-a-man-exercising-royalty-free-illustration/165817030> [Accessed 5 February 2024]. Source adapted.

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