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Sports, exercise and health science
Standard level
Paper 2

26 April 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]**.

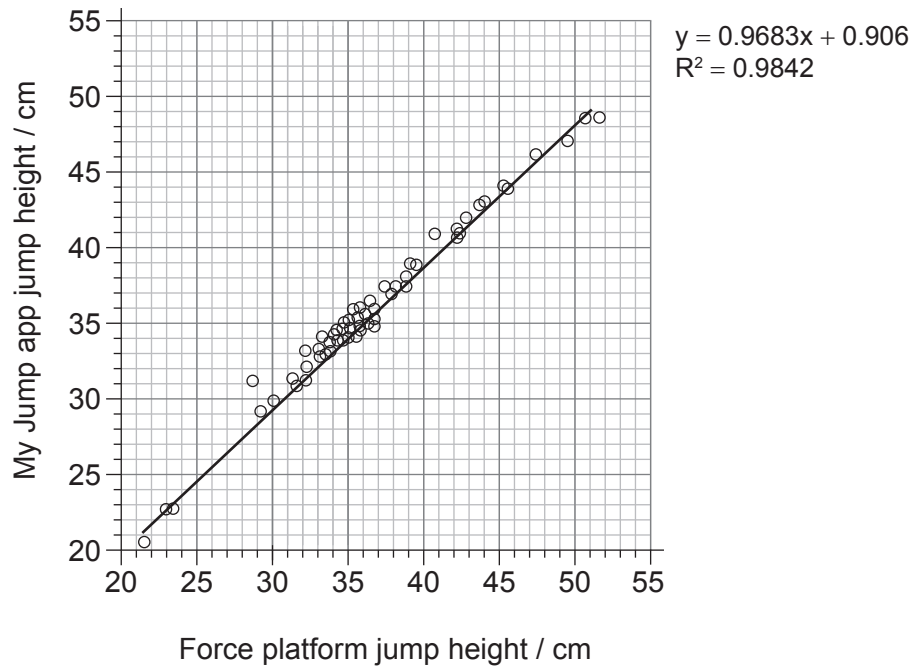


Section A

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

- 1. A study examined reliability and validity of the My Jump iPhone application in measuring jump height. Each participant performed 5 vertical jumps on a force platform while simultaneously being assessed using the My Jump app. A force platform is a standard device for measuring jump height.

The graph shows the correlation between jump height recorded by the My Jump app and the force platform.



- (a) (i) State the greatest jump height value as measured by the force platform. [1]

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- (ii) Calculate, in cm, the difference between the greatest values recorded by the force platform and the My Jump app. [1]

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(This question continues on the following page)



(Question 1 continued)

(iii) Using the data, outline the validity and reliability of the My Jump app. [3]

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(iv) A two-tailed, paired *t*-test was conducted. The calculation yielded $P < 0.001$. Comment on the meaning of the results from the *t*-test. [1]

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(v) The researchers in this study hypothesized that the My Jump iPhone application is a valid and reliable tool to measure jump height. Comment on whether or not the data support this hypothesis. [1]

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(b) Muscles require adenosine triphosphate (ATP) during the vertical jump.

(i) Identify the dominant energy system in ATP production. [1]

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(ii) Analyse how this system contributes to ATP production. [3]

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2. (a) List the chemical elements in a protein molecule. [1]

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- (b) A recreational dancer (with a healthy BMI) starts training for a competitive marathon. Identify how their recommended macronutrient intake changes. [3]

Macronutrient	Change in recommended intake when marathon training
Carbohydrate
Protein
Fat

3. (a) Explain the reasons why adenosine gains and loses a phosphate molecule. [4]

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- (b) Describe the role of calcium ions during the filament sliding of skeletal muscle contraction. [3]

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4. (a) Discuss the mechanism of oxygen exchange between the alveoli and the capillaries. [4]

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- (b) Distinguish how cardiac output and resting heart rate would differ between trained and untrained individuals. [2]

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- (c) Identify **two** cardiovascular adaptations that cause the differences in cardiac output between trained and untrained individuals. [2]

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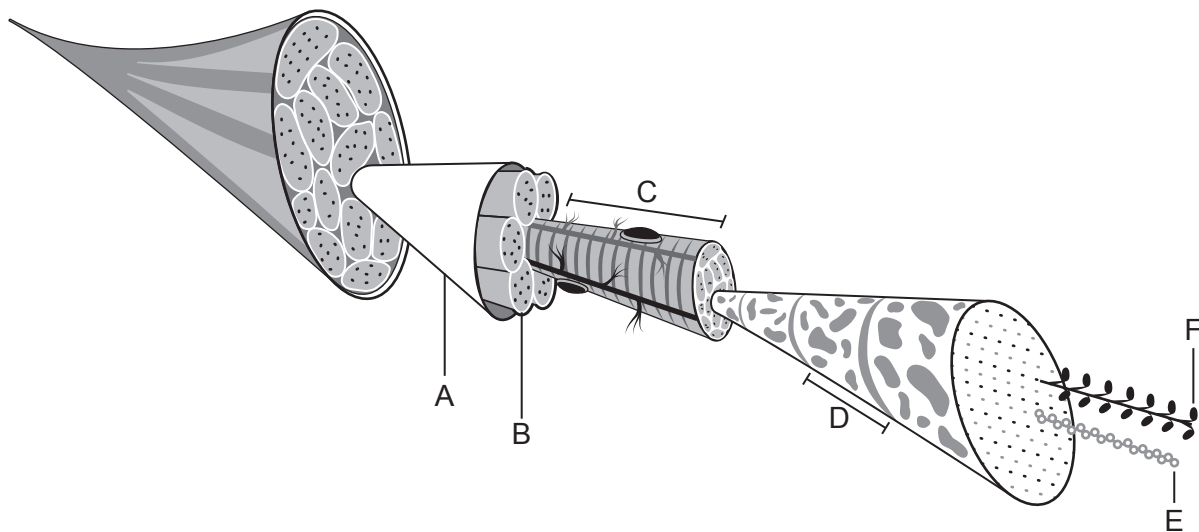
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Section B

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

- 5. (a) Outline the mechanics of ventilation in the human lungs during inspiration. [6]
- (b) Using an example from a team sport, evaluate the application of psychological refractory period (PRP). [5]
- (c) Annotate the structure of skeletal muscle. Write your answers in the answer pages following, not on the diagram. [6]



- (d) Using an example, discuss how the standard deviation is useful for comparing the means and the spread of data between two or more samples. [3]
- 6. (a) Discuss systolic and diastolic blood pressure at rest and during exercise for a trained athlete. [4]
 - (b) Discuss the relationship between selective attention and memory. [5]
 - (c) Using examples, outline how a coach uses periodization, progression, overload, specificity, and reversibility to maximize athletic development. [5]
 - (d) Discuss how heat contributes to cardiovascular drift during a football (soccer) game. [6]



7. (a) Outline how a figure skater uses the law of conservation of angular momentum to perform a pirouette. [6]



- (b) Analyse how different methods can improve memory. [5]
(c) Describe Newton's laws and how they apply in football (soccer). [5]
(d) Distinguish between the fuel sources of the three energy systems. [4]



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12EP09

Turn over

A large rectangular area containing horizontal dotted lines for writing.



12EP10

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References:

1. Balsalobre-Fernández, C., et al, 2015. The validity and reliability of an iPhone app for measuring vertical jump performance. *Journal of Sports Sciences*, 33(15), pp. 1574–9. Source adapted.
5. (c) <https://nl.dreamstime.com/stock-illustratie-structuur-van-skeletachtige-spier-image71569200>.

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12EP12