



22126602

**SPORTS, EXERCISE AND HEALTH SCIENCE
STANDARD LEVEL
PAPER 2**

Candidate session number

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Thursday 10 May 2012 (afternoon)

Examination code

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.
- Write your answers in the boxes provided.
- A calculator is required for this paper.
- The maximum mark for this examination paper is *[50 marks]*.



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SECTION A

Answer **all** questions. Write your answers in the boxes provided.

1. A study investigated the relationship between tidal volume and respiratory frequency on maximal volume expired in competitive triathletes. The maximal respiratory values (mean \pm standard deviation) from cycle ergometry and treadmill running are shown in the table below.

	Cycle ergometer	Treadmill
Tidal volume (V_T / ml)	3196 \pm 468	3179 \pm 505
Respiratory frequency (f_R / breaths min^{-1})	51.7 \pm 6.7	48.3 \pm 5.7
Maximal volume expired ($V_E \text{ max}$ / l min^{-1})	157.5 \pm 29.4	145.7 \pm 27.5

[Source: adapted from D Carey, *et al.*, (2008), *Journal of Exercise Physiology Online*, 11(4), pages 44–50]

- (a) Define the term *tidal volume*. [1]

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- (b) Calculate the percentage difference in maximal volume expired between cycle ergometry and treadmill running. [1]

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(Question 1 continued)

- (c) State the relationship between inspiratory reserve volume (IRV) and tidal volume during exercise. [1]

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- (d) Suggest reasons for the difference in the value of maximal volume expired for cycle ergometry and treadmill running. [3]

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- (e) Explain how the standard deviation is useful for comparing the **two** modes of exercise. [2]

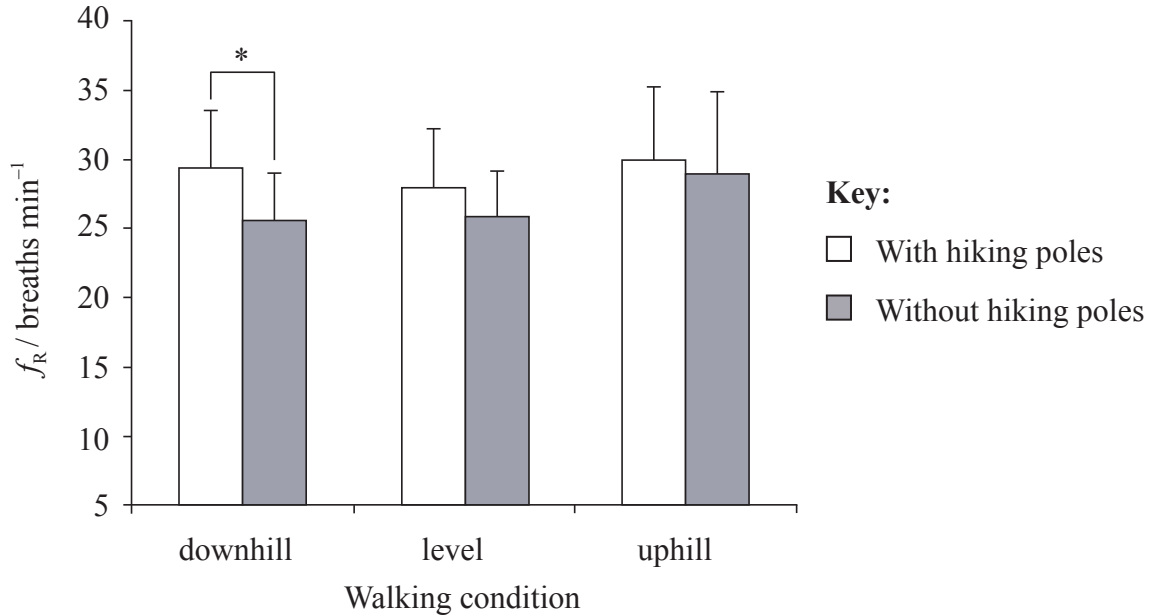
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(Question 1 continued)

A study recorded respiratory frequency during walking at the same speed uphill, downhill and on level ground. The respiratory frequency (mean \pm standard deviation) either with or without using hiking poles is shown below.



* $p < 0.05$

[Source: adapted from Perrey and Fabre, (2008), *Journal of Sports Science and Medicine*, 7, pages 32–38]

(f) State the number of breaths per minute during downhill walking without poles. [1]

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(g) Explain the difference in respiratory frequency with and without hiking poles during downhill walking. [2]

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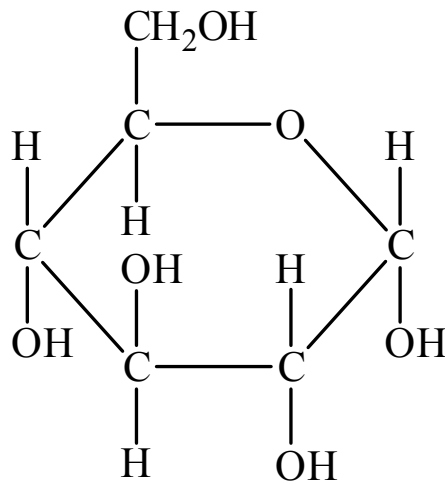
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2. (a) Identify the molecule shown in the diagram below.

[1]



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(b) Outline the role of **two** macronutrients in the diet.

[2]

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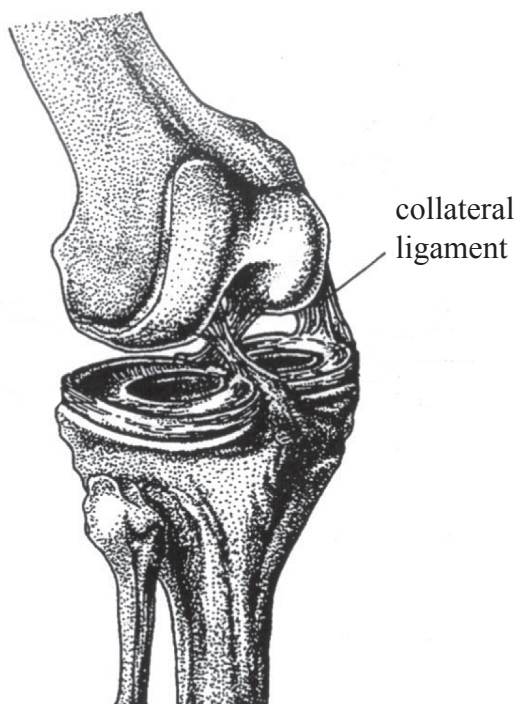
(c) Explain the function of insulin in glucose uptake during exercise.

[2]

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3. The diagram below shows the knee joint.



[Source: M Cross, N Gibbs and J Gray, (1991), *The Sporting Body*, page 161]

(a) List **two** bones that form the knee joint. [1]

1. 2.

(b) Determine the movements at the knee joint in relation to joint action and muscle contraction when kicking a soccer ball. [3]

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4. (a) Identify **two** roles of feedback when learning to shoot in basketball. [2]

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- (b) Distinguish between *short-term sensory store* and *short-term memory*. [3]

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- (c) Explain the concept of the psychological refractory period (PRP). [3]

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(Question 4 continued)

- (d) Outline the use of progressive part practice when teaching a beginner how to swim. [2]

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SECTION B

Answer **one** question. Write your answers in the boxes provided.

5. (a) (i) Define the terms *origin* and *insertion* of muscles. [2]
- (ii) Describe the functions of the axial and appendicular skeleton. [3]
- (b) Outline the types of movement possible at the hip joint. [4]
- (c) Explain how the structure and function of slow twitch (type I) muscle fibres contributes to the performance of endurance athletes. [4]
- (d) (i) Discuss how the factors that affect projectile motion can influence shot put technique. [4]
- (ii) Explain how Newton’s laws of motion apply to shot put technique. [3]
6. (a) (i) Outline the role of hemoglobin in oxygen transportation when playing sport. [2]
- (ii) Describe the cardiovascular adaptations from chronic endurance exercise training. [4]
- (b) Discuss how systolic and diastolic blood pressure respond to static exercise. [4]
- (c) Describe the process of aerobic and anaerobic catabolism of glucose. [4]
- (d) Evaluate the relative contributions of the **three** energy systems for a team game of your choice. [6]
7. (a) Discuss, with the use of relevant examples, the differences between a skilled and novice performer. [4]
- (b) Outline the importance of Physical Activity Readiness Questionnaire (PAR-Q). [4]
- (c) Outline the protocol used in the multistage fitness test. [4]
- (d) Evaluate **two** methods of body composition testing. [6]
- (e) Distinguish between Fleishman’s *physical proficiency abilities* and *perceptual motor abilities*. [2]



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Please **do not** write on this page.

Answers written on this page
will not be marked.

