Diploma Programme
Programme du diplôme
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Sports, exercise and health science
Standard level
Paper 2

Friday 17 May 2019 (afternoon)

1 hour 15 minutes

Candidate session number

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]**.

2219–6605

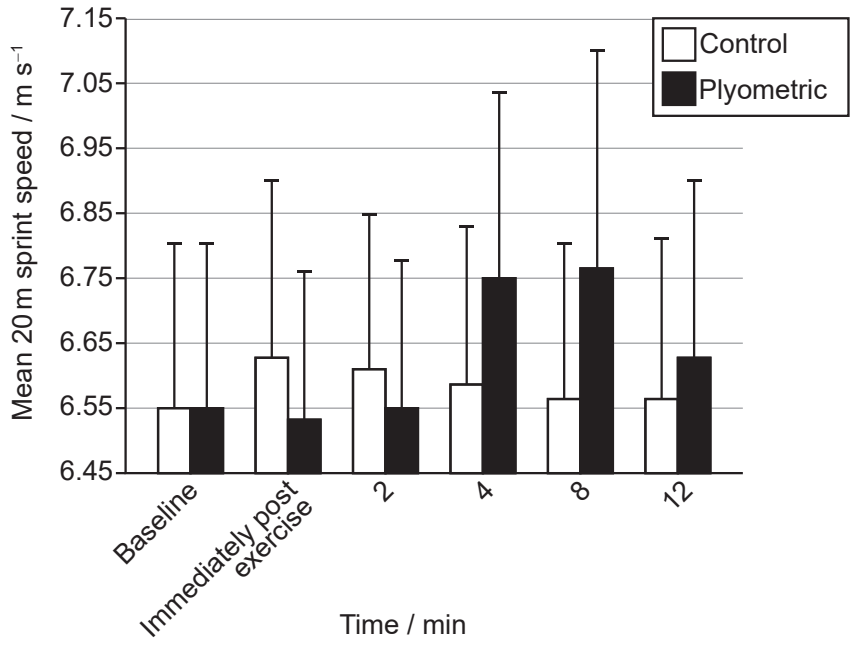
Section A

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

1. A study investigated the effect of plyometric exercise on sprint speed. (Plyometric exercise involves rapid and repeated stretching and contracting of the muscles.) The mean speed of each participant was measured during a 20 m sprint as a baseline and then in a further five 20 m sprints. During the first 75 seconds of the interval between sprints the participants carried out one of the following activities:

- Plyometric: three sets of alternate leg bounds (running-like movement, jumping from one leg to the other consecutively)
- Control: continuous walking.

The graph shows the mean sprint speed and positive standard deviation value for both conditions.



[Source: Anthony Turner *et al.*, Postactivation Potentiation of Sprint Acceleration Performance Using Plyometric Exercise, *Journal of Strength and Conditioning Research* **29** (2), pp. 343–50, https://journals.lww.com/nsca-jscr/fulltext/2015/02000/Postactivation_Potentiation_of_Sprint_Acceleration.9.aspx; National Strength and Conditioning Association]

A paired *t*-test was conducted to compare mean sprint speed at 4 minutes with mean sprint speed at baseline. The results were:

- Plyometric condition: $p < 0.05$
- Control condition: $p > 0.05$

(This question continues on the following page)

(Question 1 continued)

(a) Identify the time and condition with the highest mean sprint speed. [1]

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(b) Calculate the difference in mean sprint speed, in m s^{-1}, between baseline and at 4 minutes for the plyometric condition. [2]

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(c) Using the data, discuss the hypothesis that plyometric exercise can improve sprint performance. [2]

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(d) Explain the reason for using a control condition in this study design. [2]

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2. (a) State **one** component transported by blood. [1]

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(b) Explain how cardiac output is maintained during prolonged exercise. [3]

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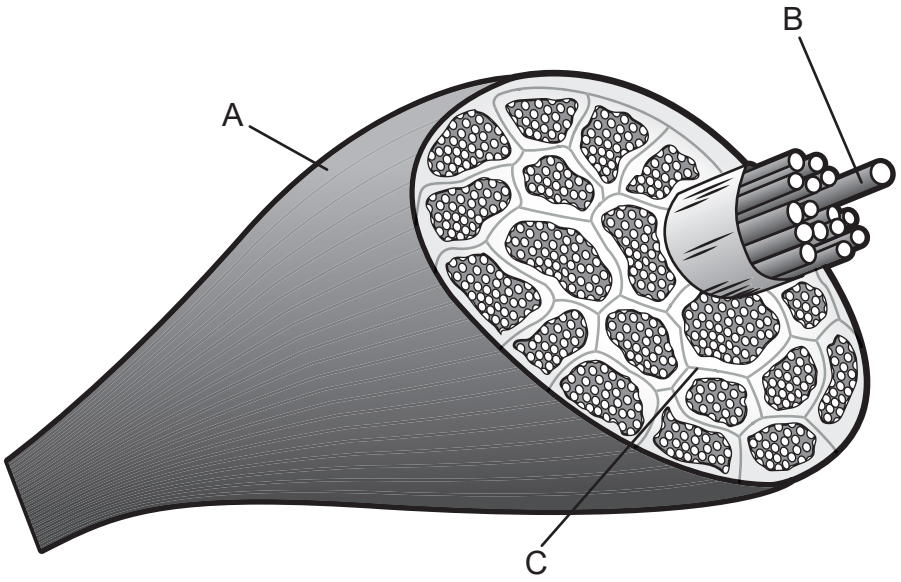
3. The diagram shows a skeletal muscle.



[Source: adapted from sportsinjuryclinic.net]

(a) Identify the structures A, B and C in the diagram. [3]

A: . . . . . .

B: . . . . . .

C: . . . . . .

(b) Define the term *origin* of a muscle. [1]

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(Question 3 continued)

(c) Explain the role of ATP in providing energy for a sprinter's muscles to contract. [3]

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(d) Explain reciprocal inhibition during knee extension when kicking. [3]

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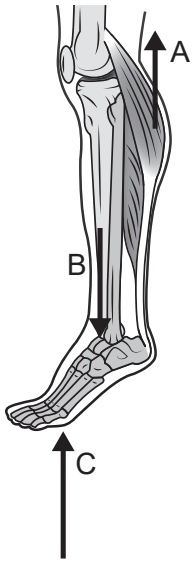
(Question 3 continued)

(e) The diagram shows the lower leg.



[Source: MARTINI, FREDERIC H.; NATH, JUDI L.; BARTHOLOMEW, EDWIN F., FUNDAMENTALS OF ANATOMY & PHYSIOLOGY, 11th Ed., ©2018. Reprinted by permission of Pearson Education, Inc., New York, New York.]

Identify the elements A, B and C of the lever system. [3]

A: . . . . . .

B: . . . . . .

C: . . . . . .

(This question continues on the following page)

(Question 3 continued)

(f) Using anatomical terminology, state the location of:

(i) The tibia relative to the femur. [1]

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(ii) The fibula relative to the tibia. [1]

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(iii) The patella relative to the tibia. [1]

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4. (a) Define *systolic blood pressure*. [1]

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(b) Predict the effect of a 100 m sprint on a runner's systolic and diastolic blood pressure. [2]

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Section B

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

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

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

(c) Describe long-term vascular adaptations to endurance training. [4]

(d) Explain how anaerobic energy systems could contribute to ATP production during a 3-minute round of boxing. [6]

6. (a) Describe the recommended relative contribution of macronutrients in a healthy balanced diet. [5]

(b) Using an example, discuss the effect of experience and memory on selective attention. [6]

(c) Outline how the Bernoulli principle affects a golf ball in flight. [5]

(d) Apply Newton's second law of motion to the distance travelled by a golf ball after being struck. [4]

7. (a) Using an example, describe the phases of learning a skill. [6]

(b) Evaluate **two** valid tests of aerobic capacity. [6]

(c) Explain the process of gaseous exchange at the alveoli. [4]

(d) Discuss the role of hormones on glucose uptake during exercise. [4]

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