Diploma Programme
Programme du diplôme
Programa del Diploma

Sports, exercise and health science
Standard level
Paper 2

Thursday 10 May 2018 (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]**.

20EP01

International Baccalaureate
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Bachillerato Internacional

Section A

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

1.   A study investigated the effect of three different pre-exercise drinks on sprint speed of football
     players during a match. Trials were completed in a randomized, double-blind fashion.
     Participants consumed the following drinks:

     •   Condition 1: High carbohydrate drink (HC)
     •   Condition 2: Low carbohydrate drink (LC)
     •   Condition 3: Placebo (PL).

     The graph shows the mean sprint speed at six different time intervals.
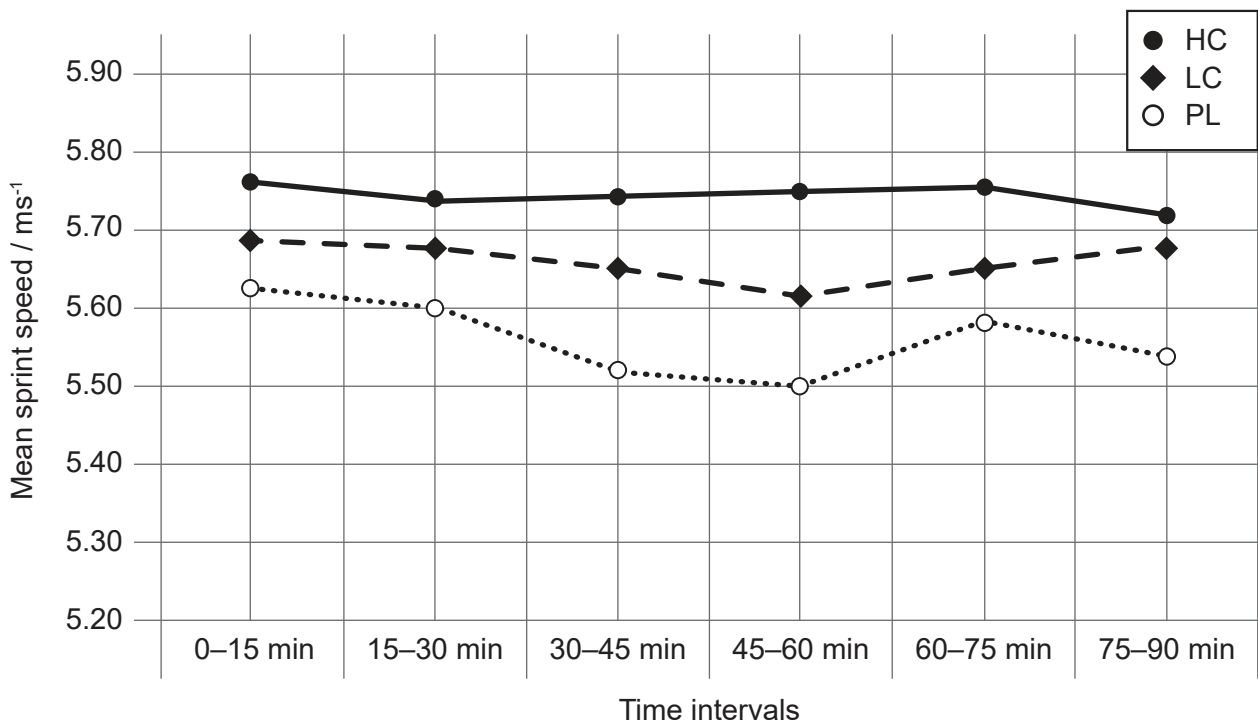
[Source: Adapted from *Journal of Science and Medicine in Sport*, 17, M Kingsley *et al.*, Effects of carbohydrate-hydration
strategies on glucose metabolism, sprint performance and hydration during a soccer match simulation in recreational players,
copyright 2013, pp. 239–243, with permission from Elsevier.]

     (a)   (i)   Identify the time interval which has the greatest difference in mean sprint speed
                  between conditions 1 and 3.   [1]

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(Question 1 continued)

(ii) Calculate the difference between mean sprint speeds for conditions 1 and 3 during the time interval identified in 1(a)(i). [2]

(iii) Using the data, discuss the hypothesis that the consumption of a high carbohydrate drink improves sprinting performance. [2]

(b) Explain how the double-blind experimental procedure was used in this study. [2]

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(Question 1 continued)

(c)   Compare and contrast the fuel sources used by the lactic acid and aerobic energy systems. [3]

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The table shows the results from an investigation comparing the mean heart rate of 30-year-old individuals at rest and during a VO_2 max test on a treadmill. There were three groups:

• Group 1: Marathon runners
• Group 2: Recreational runners
• Group 3: Sedentary individuals.

	Time of test	Group 1	Group 2	Group 3
Mean heart rate / beats min^{-1}	At rest	48	55	68
	At 6 minutes	119	132	153
	At 12 minutes	170	178	180

(d)   Calculate the difference between the mean heart rate at rest of groups 1 and 3. [2]

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(Question 1 continued)

    (e)   Explain possible reasons for differences in the mean heart rate of the marathon runners with the other groups. [3]
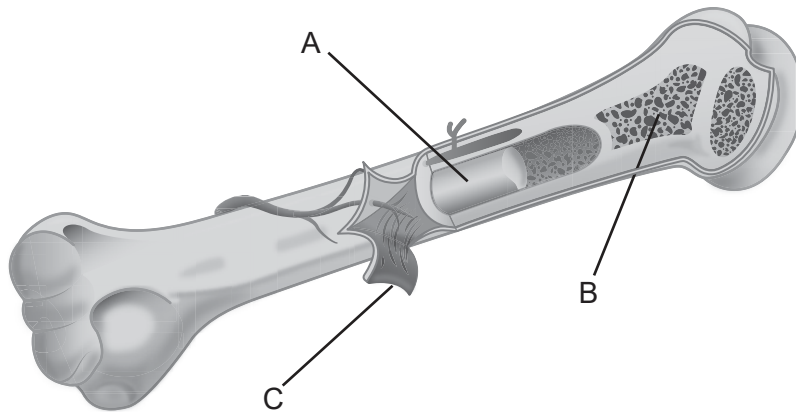
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2. The diagram shows the humerus.

(a) Label the structures A, B and C.   [3]

A.   . . . .

B.   . . . .

C.   . . . .

(b) State the location of the humerus in relation to the radius using anatomical terminology.   [1]

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(c) Identify the class of lever that is working at the elbow joint when the biceps is contracting.   [1]

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3.   (a)   Outline the following components of fitness:

(i)   flexibilty   [1]

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(ii)   reaction time   [1]

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4. (a) (i) Define *standard deviation*. [1]

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(ii) Discuss how standard deviation can be used to interpret data. [2]

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5.   (a)   Distinguish between the short-term memory and long-term memory in terms of capacity and duration.   [2]

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(b)   Using an example, explain how selective attention and previous experience influence an athlete's performance.   [3]

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Section B

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

6.　(a)　Describe **five** features of a synovial joint. [5]

　　　(b)　Discuss the process of gaseous exchange at the alveoli during exercise. [4]

　　　(c)　Outline the concept of angular momentum occurring in the legs of an athlete sprinting on a track. [5]

　　　(d)　Analyse the contraction of skeletal muscle after the release of calcium ions from the sarcoplasmic reticulum. [6]

7.　(a)　Using examples, describe reliability and validity in fitness tests. [4]

　　　(b)　Evaluate sub-maximal fitness tests. [4]

　　　(c)　Describe the intrinsic and extrinsic regulation of the heart. [6]

　　　(d)　Discuss expected changes to systolic and diastolic blood pressure between rest and during prolonged cycling. [6]

8.　(a)　Distinguish between saturated and unsaturated fatty acids. [4]

　　　(b)　Discuss the contributions of the anaerobic energy systems during a training run. [6]

　　　(c)　Describe how feedback is used in Welford's model of information processing to affect performance. [6]

　　　(d)　Explain how a football player quickly stepping one way then another is using the psychological refractory period (PRP) to gain advantage over a defender. [4]

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will not be marked.

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