Diploma Programme
Programme du diplôme
Programa del Diploma

Sports, exercise and health science
Standard level
Paper 2

Wednesday 18 November 2015 (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.
- Write your answers in the boxes provided.
- A calculator is required for this paper.
- The maximum mark for this examination paper is **[50 marks]**.

16 pages

16EP01

International Baccalaureate
Baccalauréat International
Bachillerato Internacional

Section A

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

1.   A study recorded the upper limb injuries of Australian rugby players. The players were placed in one of three groups depending on their level of competition:

- Group A – professional players
- Group B – semi-professional players
- Group C – amateur players

The table below shows the upper limb injury rates per 1000 playing hours for each group from 2004 to 2008.

Injury region	Group A	Group B	Group C
Shoulder	3.57	6.61	7.14
Upper arm	0.18	0.05	0.00
Elbow	0.36	0.44	0.33
Forearm	0.54	0.41	0.27
Wrist	0.00	0.68	0.60
Hand	1.43	1.83	2.40

[Source: Reproduced from *British Journal of Sports Medicine*, Juliana Usman and Andrew Stewart McIntosh, **47**(6), pp. 374–379. © 2013, with permission from BMJ Publishing Group Ltd.]

(a)   State which group has the highest injury rate per 1000 playing hours for elbow injuries.   [1]

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(b)   Calculate the injury rate per 1000 playing hours for all upper limb injuries for the amateur players.   [2]

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(Question 1 continued)

(c) Discuss the hypothesis that upper limb injury is related to the level of competition of the rugby players. [3]

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(Question 1 continued)

A second study was conducted using the same rugby players. The study recorded the number of rugby games that were missed due to upper limb injury. The players were divided into two groups according to their body weight:

- Group 1 – 90kg and above
- Group 2 – 89kg and below

The chart below shows the mean number of rugby games that were missed due to upper limb injury for each group.
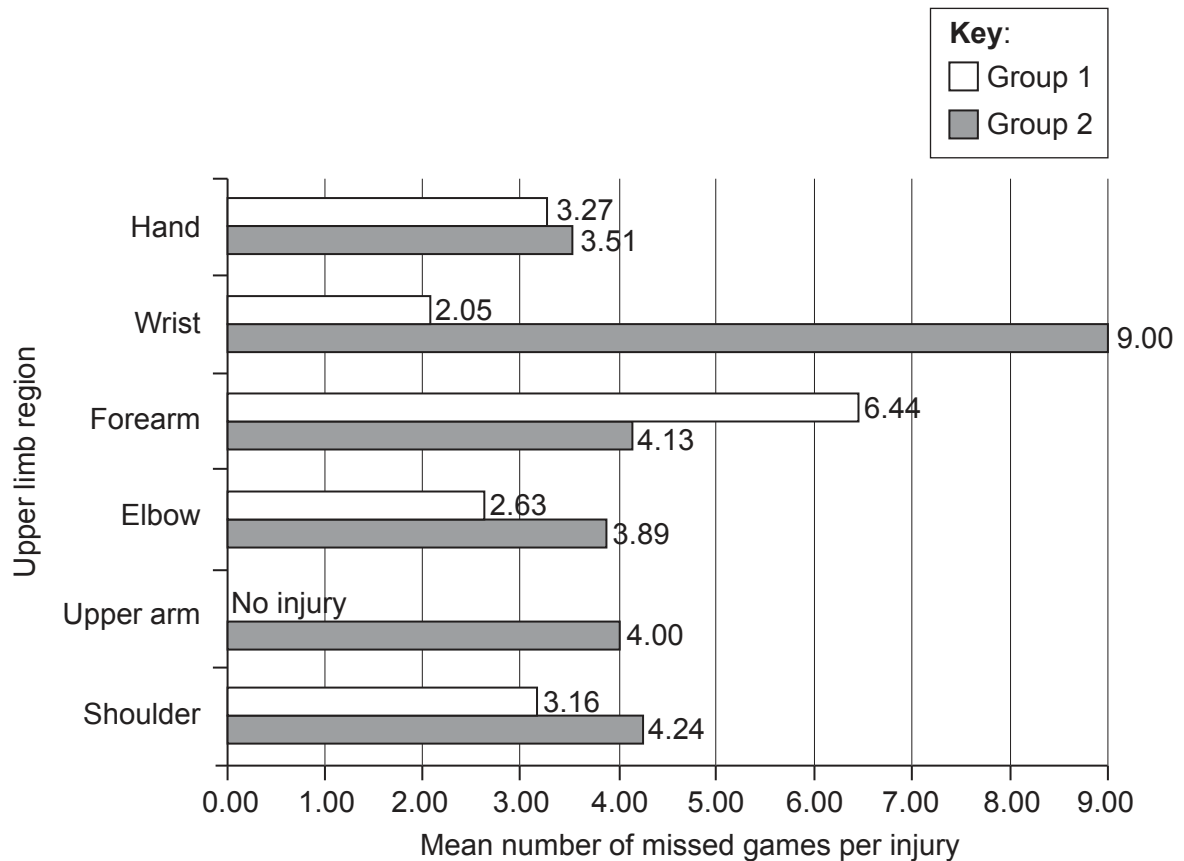
[Source: Reproduced from *British Journal of Sports Medicine*, Juliana Usman and Andrew Stewart McIntosh, **47**(6), pp. 374–379. © 2013, with permission from BMJ Publishing Group Ltd.]

(d)   Identify the upper limb region and group with no missed games due to injury.   [1]

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(Question 1 continued)

(e)   Distinguish between Group 1 and Group 2 in terms of the mean number of games
       missed due to upper limb injury.   [2]

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(f)   Explain delayed onset muscle soreness (DOMS).   [3]

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2. (a) State **two** types of bone.   [1]

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(b) Describe the role of the agonist and the antagonist during extension of the elbow joint.   [2]

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(c) Explain the oxygen deficit and oxygen debt response for a swimmer competing in a 100 m race.   [3]

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(d) Compare the cardiac output for a trained and untrained individual during maximal exercise.   [2]

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3. (a) List **two** types of blood cells. [1]

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2. . . . .

(b) Outline the systemic circulation. [2]

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(c) Explain why maximal oxygen consumption (VO_2max) data is presented in litres per minute ($L\ min^{-1}$) and in milliliters per kilogram per minute ($ml\ kg^{-1}min^{-1}$). [2]

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16EP07

4.   (a)   Compare motor programmes from both open and closed loop perspectives.   [2]

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(b)   Outline why a sports scientist must be careful when interpreting the correlation between two variables.   [3]

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Section B

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

5. (a) Explain why a fitness trainer can expect maximal oxygen consumption to vary for a family of males and females, children and adults. [4]

(b) Outline cardiovascular drift and the implications of using heart rate as a measure for training intensity during prolonged sub-maximal running. [4]

(c) Outline **three** types of sensory receptors. [6]

(d) Explain the signal-detection process (DCR) in a motor skill of your choice. [6]

6. (a) Distinguish between fibrous, cartilaginous and synovial joints. [6]

(b) Explain the concept of angular momentum during the flight phase of a front somersault. [6]

(c) Describe the role of acetylcholine in stimulating muscular contraction. [4]

(d) Explain the mechanics of exhalation in the human lungs during the **initial** stages of **sub-maximal** exercise. [4]

7. (a) Outline current recommendations for a healthy balanced diet. [6]

(b) Explain how glucose molecules can combine to form disaccharides and polysaccharides. [4]

(c) Evaluate field and laboratory testing of human performance. [6]

(d) Distinguish between the Karvonen method and the training heart rate range to monitor exercise intensity. [4]

Turn over

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