

Sports, exercise and health science
Standard level
Paper 2

Tuesday 30 October 2018 (afternoon)

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]**.



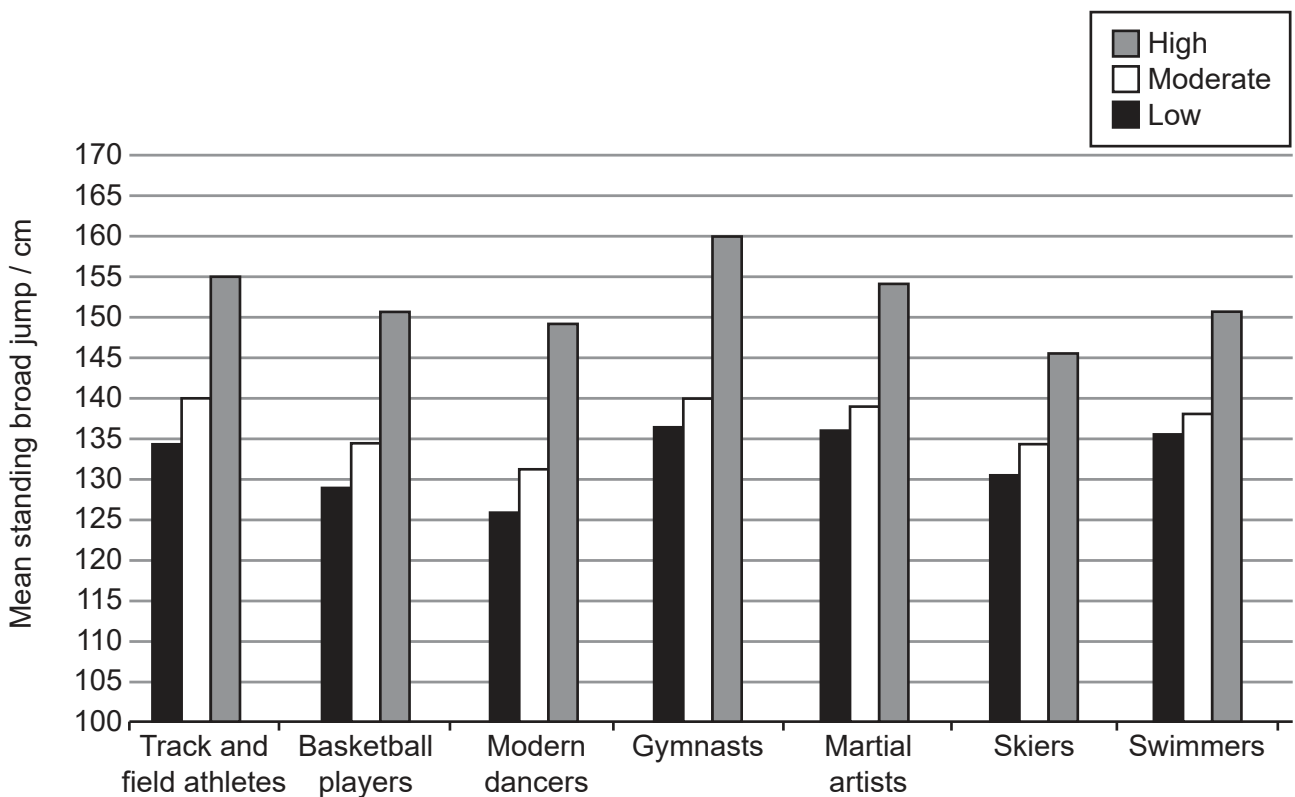
Section A

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

1. A study examined physical fitness levels of 10-year-old children who regularly participate in sports. The 900 participants were divided evenly between three groups according to their training level:

- Low: training less than 1 hour per week
- Moderate: training between 1 and 5 hours per week
- High: training more than 5 hours per week.

Each participant performed the standing broad jump fitness test. The mean results are shown in the graph.



[Source: © International Baccalaureate Organization 2018]

(a) (i) Identify the training level and sport for the group that has the highest mean score on the standing broad jump fitness test.

[1]

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16EP02

(Question 1 continued)

- (ii) Calculate the difference of mean standing broad jump fitness test score between moderate and high training levels for the group stated in 1(a)(i). [2]

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- (iii) Using the data, deduce the effect of high level of participation in sport on performance in the standing broad jump test. [2]

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- (iv) A two-tailed, unpaired *t*-test was conducted on the data. The calculations yielded the following results:

- comparing low and moderate training level yielded $p > 0.05$
- comparing moderate and high training level yielded $p < 0.05$
- comparing low and high training level yielded $p < 0.01$.

Comment on the meaning of the results from the *t*-test. [3]

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(Question 1 continued)

- (b) (i) State an alternative test (other than standing broad jump) for measuring leg power. [1]

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- (ii) Outline the procedure for measuring leg power in the test stated in 1(b)(i). [3]

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- 2. (a) State the general characteristic common to muscle tissue that allows the muscle to stretch and return to its original resting length. [1]

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- (b) Describe the functions of ligaments and tendons in a joint such as the knee joint. [2]

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- (c) Distinguish between maximal oxygen consumption during cycling and arm ergometry. [1]

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16EP04

(Question 2 continued)

- (d) Describe the process of oxygen exchange between the lungs and pulmonary capillaries at rest. [4]

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- (e) Distinguish how cardiac output, stroke volume and resting heart rate would differ between trained and untrained women during exercise. [3]

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- 3. (a) Explain how acetylcholine (ACh) initiates skeletal muscle contraction. [2]

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16EP05

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(Question 3 continued)

(b) Analyse how capillary and mitochondrial densities affect slow twitch (type I) muscle fibres.

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(c) Explain the role of insulin and muscle contraction on glucose uptake during exercise.

[3]

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16EP06

Section B

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

4. (a) Distinguish between the **three** different types of muscle. [3]
- (b) (i) Define *motor programme*. [1]
- (ii) Apply the concept of motor programme to improving performance of a gymnastics routine. [2]
- (c) Explain how running versus static exercise (such as holding a plank position) affect systolic and diastolic blood pressure levels. [4]
- (d) Using Welford's model of information processing, describe how information enters the short-term memory (STM). [4]
- (e) Discuss how the **three** energy systems contribute to ATP production during an 800-metre run. [6]
5. (a) Outline the chemical control of ventilation during exercise. [3]
- (b) Describe the phenomenon of oxygen deficit. [3]
- (c) Outline **two** named methods of memory improvement. [4]
- (d) Using a sporting example, predict how a change in radius affects speed of rotation. [4]
- (e) Explain sliding filament theory after acetylcholine (ACh) increases muscle membrane permeability. [6]
6. (a) Distinguish between the movement permitted in different types of joints. [3]
- (b) Describe how cardiovascular drift takes place. [3]
- (c) Outline the re-synthesis of ATP by the ATP-CP system. [4]
- (d) Using an example, analyse conditions for acceleration. [4]
- (e) Using examples from team sports, evaluate the concept of the psychological refractory period (PRP). [6]



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16EP15

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16EP16