22146602

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Baccalauréat International
Bachillerato Internacional

SPORTS, EXERCISE AND HEALTH SCIENCE
STANDARD LEVEL
PAPER 2

Candidate session number

Wednesday 7 May 2014 (morning)

1 hour 15 minutes

Examination code

2214 – 6602

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

SECTION A

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

1. A study investigated differences in fitness components between Spanish adolescents living in rural (Group 1) and urban (Group 2) areas. The table below shows the mean results (SD) for both health and skill-related fitness components for both groups.

Fitness test	Group 1	Group 2
VO_2 max / ml kg^{-1} min^{-1}	46.7 (0.2)	45.2 (0.1)
Illinois agility / seconds	22.7 (0.1)	22.4 (0.0)
Sit and reach / cm	19.2 (0.2)	20.1 (0.2)
Standing broad jump / cm	148.9 (0.8)	147.3 (0.6)
Hand grip strength / kg	24.1 (0.8)	23.3 (0.1)
Bent arm hang / seconds	14.0 (0.4)	11.6 (0.3)

[Source: adapted from P Chillón *et al.*, (2011), *Journal of Science and Medicine in Sport,* **14** (5), pages 417–423]

(a) Identify **one** skill-related fitness test used in the study. *[1]*

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(b) Calculate the mean difference, with appropriate units, between Group 1 and Group 2 for:

(i) sit and reach test; *[1]*

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(ii) muscular endurance. *[2]*

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(This question continues on the following page)

(Question 1 continued)

(c) Define *health-related fitness*. *[1]*

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(d) Discuss the hypothesis that the fitness of adolescents living in a rural area is greater than that of adolescents living in an urban area. *[3]*

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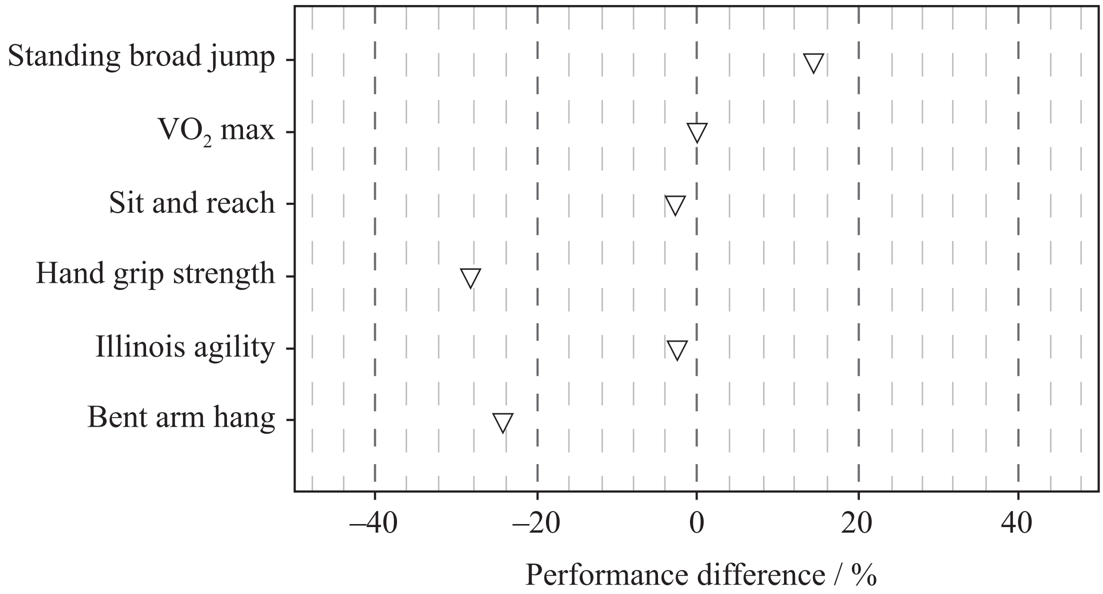
(Question 1 continued)

The figure below shows the mean percentage difference in performance on a variety of fitness scores for Dutch children in 1980 compared to fitness scores from 2006. The results for 1980 are on the 0 % performance difference mark.



[Source: J Runhaar *et al.*, (2010), *Journal of Science and Medicine in Sport*, **13**, pages 323–328]

(e) Identify which test showed:

(i) no difference in performance from 1980 to 2006; *[1]*

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(ii) the greatest decrease in performance from 1980 to 2006. *[1]*

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(This question continues on the following page)

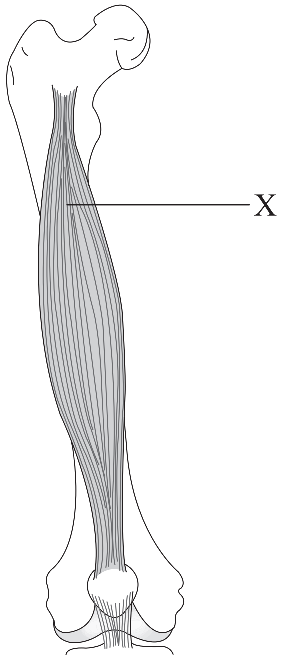
(Question 1 continued)

(f) Analyse the ankle joint movement at the take-off point for the standing broad jump in relation to joint action and type of muscle contraction. *[3]*

2. (a) Define the term *cell respiration.* *[1]*

(b) Evaluate the re-synthesis of ATP via the ATP-CP system. *[3]*

3. (a) State the name of the thigh muscle indicated by label X in the diagram below. *[1]*



[Source: adapted from C Thompson, (1985), *Manual of Structural Kinesiology*, Times Mirror/Morby College Publishing]

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(b) Identify the muscle fibre type required for successful performance in the Olympic 100 m sprint. *[1]*

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(Question 3 continued)

(c) Explain the role of acetylcholine and cholinesterase in stimulating tricep muscle contraction for a Paralympic wheelchair athlete. *[3]*

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(d) Distinguish between the variability of maximal oxygen consumption during treadmill running and arm ergometry. *[2]*

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Turn over

4. (a) List the **two** stages of learning a motor skill that occur before progression to the autonomous stage. *[1]*

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2. . . . .

(b) Distinguish between Fleishman's **two** broad categories of human abilities. *[2]*

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(c) Explain factors that would contribute to different rates of learning a new skill. *[3]*

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SECTION B

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

5. (a) Identify the **three** types of muscle tissue found in the human body. *[2]*

(b) Outline the structural components of voluntary muscle. *[4]*

(c) Distinguish between the role of insulin and glucagon during a long distance cycle race. *[4]*

(d) Compare the dietary macronutrient needs of a highly trained endurance cyclist and an untrained endurance cyclist. *[3]*

(e) Discuss the oxygen deficit and oxygen debt response in a highly trained cyclist during a long distance race. *[7]*

6. (a) (i) Define *Newton's second law of motion*. *[1]*

(ii) Apply Newton's third law of motion when a sprinter starts a race from the blocks. *[2]*

(b) Distinguish between the Fosbury Flop and the scissors technique in terms of the position of the centre of mass of the jumper. *[4]*

(c) Compare the distribution of blood in a runner at rest and during a 10 000 m race. *[4]*

(d) Explain the mechanics of pulmonary ventilation in the human lungs during high intensity exercise. *[6]*

(e) Outline the role of hemoglobin in the transportation of gases in the body of a trained athlete. *[3]*

7. (a) Describe how a 200 m butterfly swimmer could apply the principles of specificity and overload to their training programme. *[4]*

(b) Identify elements you would expect to find in a motor programme for performing the backstroke in swimming. *[2]*

(c) Distinguish between open loop and closed loop motor programmes. *[4]*

(d) Discuss the relationship between memory and selective attention. *[4]*

(e) Compare the differences in motor performance between a skilled and a novice swimmer. *[6]*

Turn over