Diploma Programme
Programme du diplôme
Programa del Diploma

Sports, exercise and health science
Standard level
Paper 2

Friday 6 May 2016 (morning)

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

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Section A

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

1. Effective play in volleyball is dependent upon forceful jumping to achieve the highest vertical displacement of the centre of mass. This is so that the hands can reach the greatest possible height above the volleyball net.

    A study was conducted on nine female volleyball players to compare traditional jumping technique (TR) with swing jumping technique (SR). The mean displacements of the centre of mass of the players are shown in the graph below.
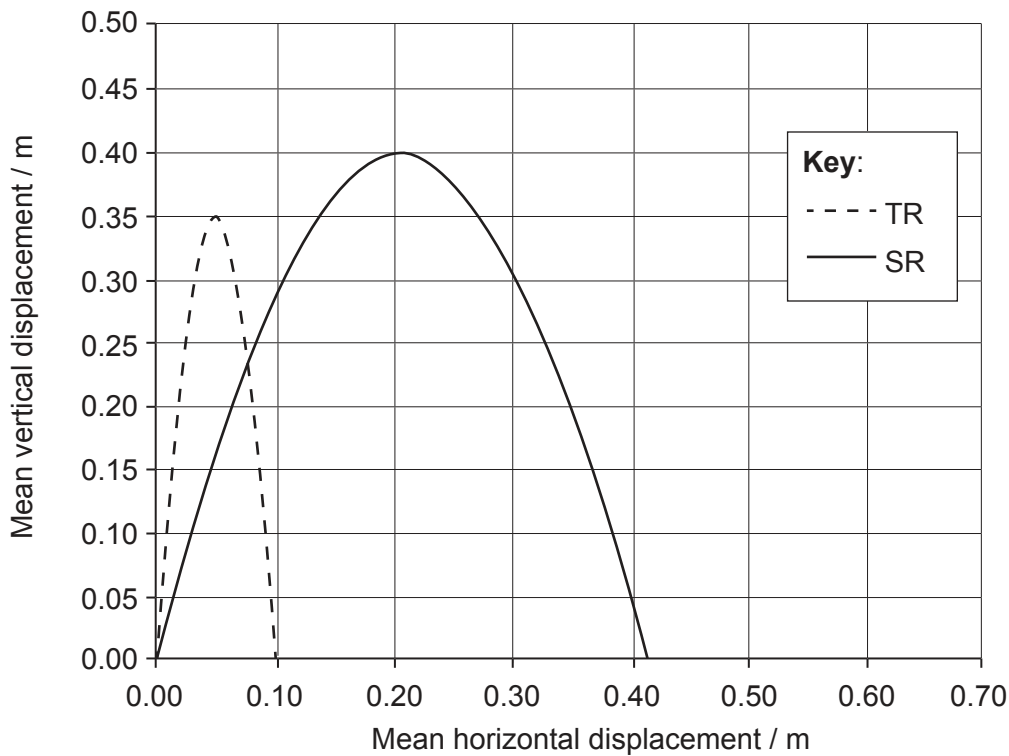
[Source: Reprinted from *Journal of Sports Science and Medicine*, Vol 13, T. Ficklin, R. Lund and M. Schipper, A Comparison of Jump Height, Takeoff Velocities, and Blocking Coverage in the Swing and Traditional Volleyball Blocking Techniques, pages 78–83, Copyright (2014), with permission from the JOURNAL OF SPORTS SCIENCE AND MEDICINE.]

    (a) Calculate using appropriate units the difference in maximum mean vertical displacement between traditional jumping technique and swing jumping technique.   [2]

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(Question 1 continued)

(b)   Define the term *centre of mass*.   [1]

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(c)   Analyse the mean vertical and horizontal displacements for traditional jumping
       technique and swing jumping technique.   [3]

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(Question 1 continued)

Muscle structure influences sprinting speed and jumping power. A study was conducted to determine the influence of limb dominance on muscle structure. The mean results for men and women are shown below.

		Rectus femoris		Vastus lateralis	
		Dominant	**Non-dominant**	**Dominant**	**Non-dominant**
Muscle thickness (cm)	Men	2.9	2.9	1.9	1.9
	Women	2.4	2.4	1.8	1.8
Muscle fascicle length (cm)	Men	10.8	11.4	8.4	7.9
	Women	9.2	8.7	8.9	8.8
Cross-sectional area (cm^2)	Men	19.9	20.0	39.8	37.0
	Women	14.0	13.7	27.1	23.8

[Source: Reprinted from *Journal of Sports Science and Medicine*, Vol 13, G Mangine, D Fukuda *et al.*, "Influence of Gender and Muscle Architecture Asymmetry on Jump and Sprint Performance", pages 904–911, copyright (2014), with permission from the JOURNAL OF SPORTS SCIENCE AND MEDICINE.]

(d)   State the anatomical region of the body where the vastus lateralis is located.   [1]

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(e)   Compare and contrast muscle structure measurements of the rectus femoris, for men and women.   [3]

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(f)   State **one** fitness test used for measuring muscular power.   [1]

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2. (a) State the name of the structure labelled X. [1]
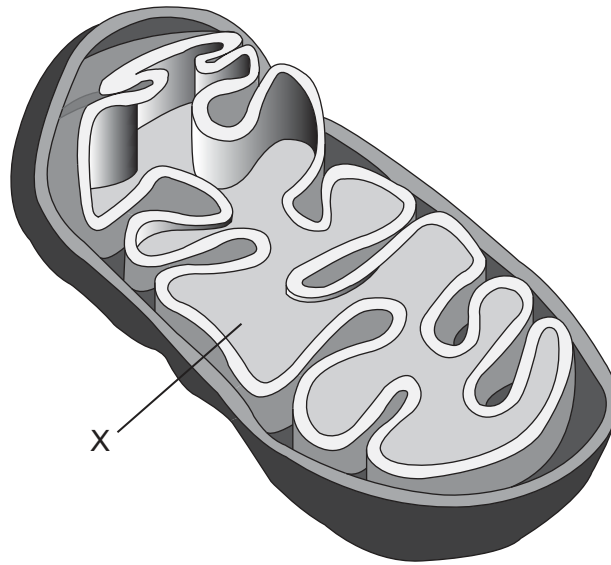
[Source: adapted from J. Sproule (2012) *Sports, Exercise & Health Science: Course Companion*.
Oxford University Press, reprinted by permission of the publisher (Taylor & Francis Ltd, http://www.tandfonline.com)]

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

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(c) Explain the mechanics of inhalation in the human lungs. [2]

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(Question 2 continued)

(d)   Describe the production of ATP from glucose by the aerobic system.   [3]

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3.   (a)   List **two** general characteristics common to muscle tissue.   [2]

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(b)   Outline the function of interoceptors in sensory input during movement.   [2]

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(c)   Explain the signal-detection process.   [3]

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4.   (a)   Identify the type of muscle in the diagram below.   [1]

Cross-striations

Nuclei
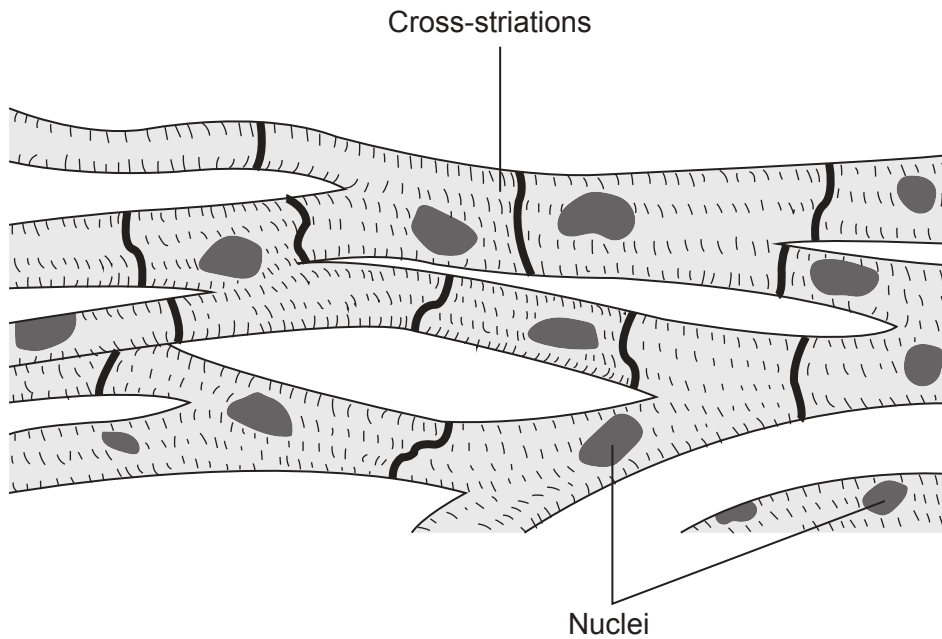
[Source: adapted from www.ucl.ac.uk]

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(b)   Comment on the variability of diastolic blood pressure during dynamic and static exercise.   [2]

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(c)   Explain the difference between adult males and females in maximal oxygen consumption.   [2]

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Section B

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

5. (a) Using examples of specific bones, outline the function of the axial skeleton. [4]

(b) Describe the process of gaseous exchange at the alveoli. [4]

(c) Explain the phenomenon of oxygen deficit. [5]

(d) (i) List **three** tests of aerobic capacity. [2]

(ii) Evaluate **one** of these tests. [5]

6. (a) Distinguish between cognitive and perceptual motor skills. [4]

(b) (i) State **three** different approaches to the classification of motor skills. [2]

(ii) Apply these **three** approaches to relevant sporting examples. [4]

(c) Discuss the differences between a skilled and a novice footballer. [4]

(d) Evaluate the relative contributions of the three energy systems in a footballer during a match. [6]

7. (a) (i) Define the term *overload* as a principle of training. [1]

(ii) Using examples, discuss **two** ways overload could be applied to an endurance training programme. [2]

(b) Outline the functions of **two** components of blood. [4]

(c) Describe the cardiovascular adaptations resulting from endurance training. [5]

(d) Explain DOMS in relation to muscle contraction. [3]

(e) Compare and contrast slow and fast twitch muscle fibre types. [5]