Diploma Programme
Programme du diplôme
Programa del Diploma

Sports, exercise and health science
Standard level
Paper 2

Thursday 19 May 2022 (morning)

Candidate session number

1 hour 15 minutes

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]**.

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15 pages

Section A

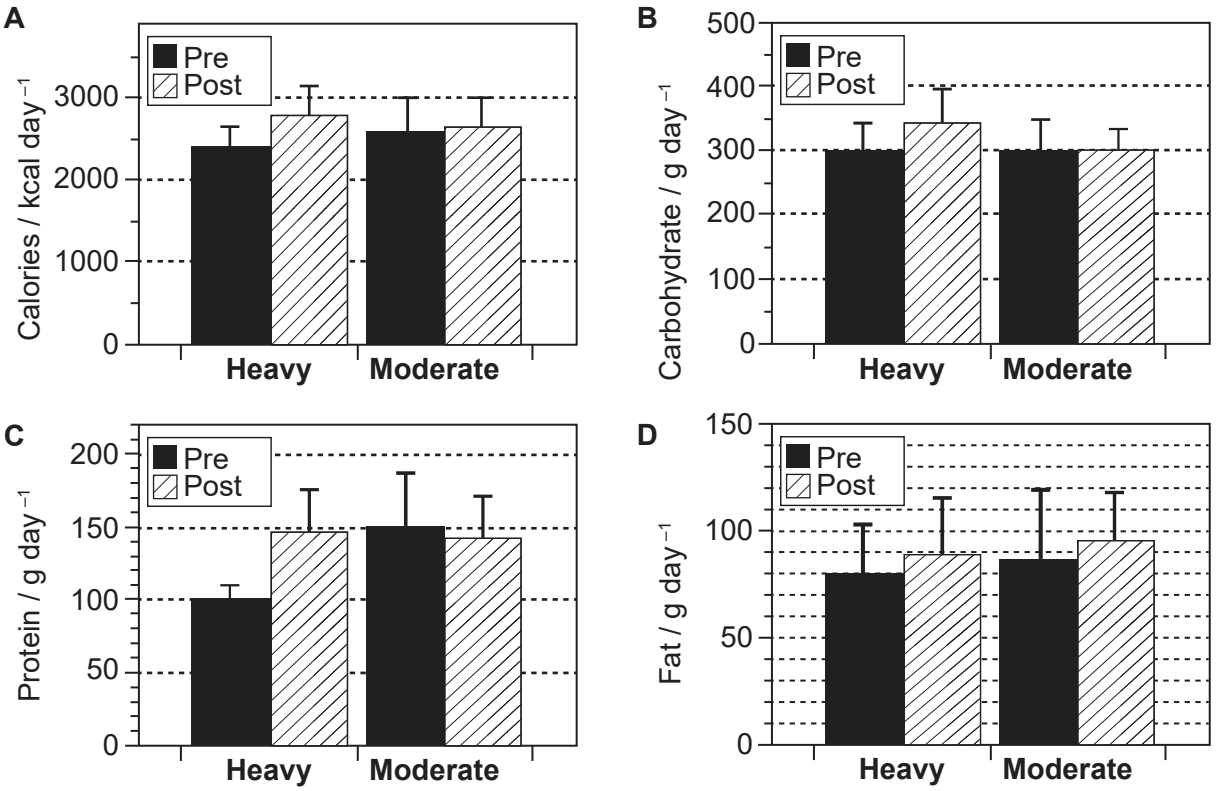
Answer **all** questions. Answers must be written within the answer boxes provided.

1. A study investigated the impact of heavy and moderate load-resistance training on nutritional intake. Nineteen resistance-trained athletes were randomly assigned to one of two groups:

- **Heavy training load** group: Trained in a loading range of 90 – 95 % of 1 repetition maximum (1 RM); 2 – 4 repetitions per set;
- **Moderate training load** group: Trained in a loading range of 80 – 85 % of 1 RM; 8 – 12 repetitions per set.

Both groups performed 3 sets of 7 exercises for the major muscle groups of the upper and lower body. Training took place 3 days a week for 8 weeks. The nutritional intake of participants was monitored during the study.

Figure 1: Nutritional intake pre- and post-intervention for the heavy and moderate training load groups, showing mean (±SD)



(a) (i) Identify the training method and nutritional component that indicated the greatest proportional change pre- and post-intervention. [1]

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(Question 1 continued)

(ii) Calculate the difference in fat intake pre- and post-testing for the heavy training load group. [2]

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(iii) With reference to **Figure 1**, discuss the effect of heavy and moderate training load on carbohydrate intake. [2]

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(iv) The results in **Figure 1** are inconclusive for fat intake in the moderate training load group. Outline the statistical reasons for this finding. [2]

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(v) Outline **two** reasons for differences in protein intake between the heavy and moderate training load groups. [2]

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(Question 1 continued)

(b) State the composition of a molecule of triacylglycerol. [1]

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(c) (i) Identify **one** fitness component that the study cited in Question 1 is designed to improve. [1]

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(ii) Explain the benefits of field fitness tests. [4]

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2. (a) Identify the bone type of the scapula. [1]

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(b) The diagram shows a gymnast holding a position called an iron cross.

Discuss the response of systolic and diastolic blood pressure to this static position. [3]

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

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(b) The diagram shows a gymnast performing a piked somersault.

Explain the manipulation of the moment of inertia during the flight and landing phases. [4]

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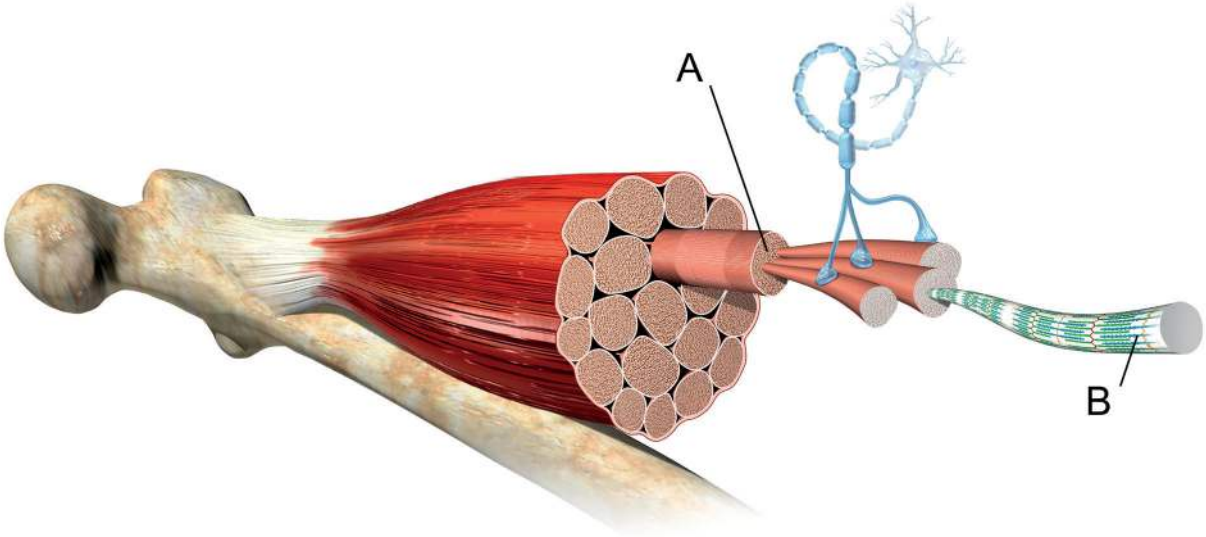
(Question 3 continued)

(c) The diagram shows skeletal muscle.



Identify the parts labelled A and B. [2]

A: . . . . . .

B: . . . . . .

(d) Describe the sequence of excitation of the heart muscle. [3]

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(Question 3 continued)

(e) A beginner participated in a seven-week tennis programme. Each week, they recorded their successful serves out of 50 attempts. Identify the type of learning curve represented by the data. [1]

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7
Successful serves (out of 50)	1	2	4	7	15	30	46

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Section B

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

4. (a) Describe nervous control of ventilation during exercise. [3]

(b) Describe the resynthesis of adenosine triphosphate (ATP) by the lactic acid (anaerobic glycolysis) system. [4]

(c) Outline **three** general features of muscle tissue. [3]

(d) An attacking football player moves in one direction and immediately changes to the opposite direction. This deceives the defender.

Explain the concept the attacking player is using to evade the defender. [4]

(e) Discuss the structure and function of the leg muscle fibres of an elite long jumper and a marathon runner. [6]

5. (a) Distinguish the characteristics of smooth and cardiac muscle. [2]

(b) Describe how a long jumper can manipulate the factors that affect projectile motion to increase their distance jumped during a competition. [4]

(c) A chronic adaptation of aerobic training is an increase in hemoglobin. Outline how this adaptation would benefit an athlete running a marathon. [4]

(d) Explain why an elite basketballer would be able to process relevant sporting signals more effectively than a novice. [4]

(e) Using examples from sport, compare motor programmes from both open-loop and closed-loop perspectives. [6]

6. (a) Describe the most appropriate teaching style for a coach to use with a group of novice javelin throwers. [3]

(b) Giving an example, outline the characteristics of saturated fatty acids. [3]

(c) Explain the phenomenon of cardiovascular drift and **one** method of reducing it. [5]

(d) A table-tennis ball is hit with topspin. Apply the Bernoulli principle to the projectile motion of the ball. [4]

(e) Discuss the factors that determine the dominant energy system. [5]

References:

Figure 1. Schoenfeld, B. J., Contreras, B., Vigotsky, A. D., and Peterson, M., 2016. Differential effects of heavy versus moderate loads on measures of strength and hypertrophy in resistance-trained men. *Journal of Sports Science and Medicine*, 15, pp. 715–722

2. (b) Gwoeii / Shutterstock.

3. (b) www.gymdrills4profs.com.

3. (c) HENNING DALHOFF/SCIENCE PHOTO LIBRARY.

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