Diploma Programme
Programme du diplôme
Programa del Diploma

Sports, exercise and health science
Standard level
Paper 3

Monday 9 May 2016 (morning)

Candidate session number

1 hour

Instructions to candidates

- Write your session number in the boxes above.
- Do not open this examination paper until instructed to do so.
- Answer all of the questions from two of the Options.
- Write your answers in the boxes provided.
- A calculator is required for this paper.
- The maximum mark for this examination paper is **[40 marks]**.

Option	Questions
Option A — Optimizing physiological performance	1 – 3
Option B — Psychology of sport	4 – 6
Option C — Physical activity and health	7 – 10
Option D — Nutrition for sport, exercise and health	11 – 14

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Option A — Optimizing physiological performance

1. A study investigated the cycling performance of ten moderately trained young adult males in 30°C heat. They were tested pre-acclimatization, and then following five days of acclimatization training (post-acclimatization). Peak power ($W.kg^{-1}$ ±SD) and mean power (W±SD) output were recorded during two 30 minute repeat-sprint cycling bouts, separated by ten minutes rest. The results are shown below.

	Peak power ($W.kg^{-1}$±SD)		**Mean power (W±SD)**	
	1st bout	**2nd bout**	**1st bout**	**2nd bout**
Pre-acclimatization	17.45 ±1.58	17.18 ±1.18	967.8 ±142.2	971.4 ±130.2
Post-acclimatization	17.97 ±1.80	17.84 ±1.63	1012.1 ±125.2	1012.1 ±119.5

[Source: Journal of sports sciences by BRITISH ASSOCIATION OF SPORTS SCIENCES ; INTERNATIONAL SOCIETY FOR ADVANCEMENT OF KINANTHRO ; SOCIETY OF SPORTS SCIENCES (GREAT BRITAIN) Reproduced with permission of TAYLOR & FRANCIS LTD in the format reuse in a book/textbook via Copyright Clearance Center.]

(a) Identify which performance measure and condition shows no difference between the 1st bout and 2nd bout output. [1]

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(b) State what happens to the standard deviation between the 1st bout and 2nd bout. [1]

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(c) Calculate using appropriate units the difference between post-acclimatization and pre-acclimatization peak power output for the 2nd bout. [2]

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(Option A continues on the following page)

(Option A, question 1 continued)

(d) Discuss **three** physiological adaptations that occur following heat acclimatization. [3]

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2. (a) Distinguish between training and overreaching. [1]

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(b) Discuss **three** indicators of overtraining in athletes. [3]

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(Option A continues on the following page)

(Option A, question 2 continued)

(c) Outline the muscular action that occurs during plyometric training. [2]

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3. (a) List **two** classes of non-nutritional ergogenic aids that are currently banned by the International Olympic Committee. [2]

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2. . . . . .

(b) State the adverse health effects of long-term use of anabolic steroids. [2]

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(c) Explain the proposed benefits to an athlete of using diuretics. [3]

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End of Option A

Option B — Psychology of sport

4. A study investigated the effects of visual imagery training on time taken to complete a computer simulated rally car driving task (rally car time). Participants were assigned to an internal visual imagery group (IVI), an external visual imagery group (EVI) and a control group (no imagery training). The table below shows the rally car times, in seconds ±SD, pre and post training.

Group	Rally car time (seconds ±SD)	
	pre	post
IVI	88.08 ±2.10	86.23 ±1.78
EVI	87.55 ±1.94	87.45 ±1.92
control	87.67 ±2.10	87.57 ±2.41

[Source: Callow *et al.*, (2013) *Frontiers in Human Neuroscience*, **7**, article 697]

(a) Identify which group shows the greatest improvement in rally car time. [1]

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(b) State what happens to the standard deviation of the control group rally car time from pre to post training. [1]

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(c) Calculate using appropriate units the difference between the IVI and the EVI group post training rally car times. [2]

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(Option B continues on the following page)

(Option B, question 4 continued)

(d) Discuss **three** factors affecting the effectiveness of mental imagery. [3]

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5. (a) Define the term *personality*. [1]

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(b) Outline **two** issues associated with the measurement of personality. [2]

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(Option B continues on the following page)

(Option B, question 5 continued)

(c) Discuss how attitudes and behaviours in sport or exercise settings are linked to social learning theory. [3]

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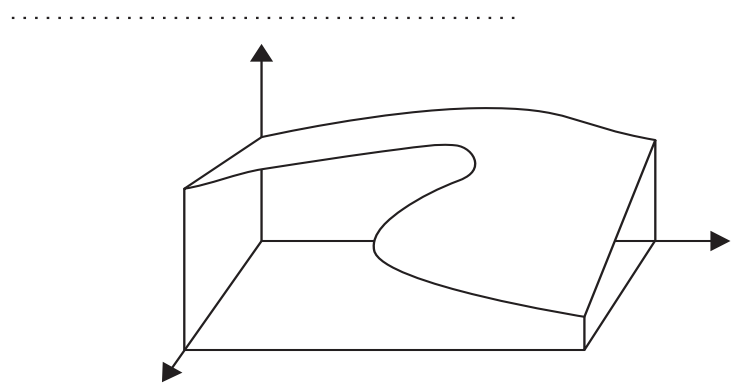
(Option B continues on the following page)

(Option B continued)

6. (a) Label the axes for the following graphical representation of the catastrophe theory. [2]



(b) Using an example from **one** sport of your choice, distinguish between cognitive and somatic anxiety. [2]

(c) Discuss the acquisition phase of psychological skills training for the purpose of enhancing exercise performance. [3]

End of Option B

Option C — Physical activity and health

7. A study examined sedentary time for 655 adolescent Australian girls. Sedentary bouts were recorded for three periods: during school (09:00–16:00), the first three hours after school (16:00–19:00) and weekends (09:00–19:00) over an 18-month period. The table below shows the average number (±SD) of sedentary bouts per day lasting 10, 20 and 30 minutes.

	Average number (±SD) of bouts per day		
Sedentary bout (minutes)	**During school**	**After school**	**Weekends**
10	8.35 ±3.69	3.78 ±2.13	15.37 ±10.25
20	2.15 ±1.38	0.84 ±0.76	3.74 ±3.77
30	0.82 ±0.70	0.29 ±0.36	1.45 ±1.95

[Source: V Carson *et al.*, (2013) *BMC Pediatrics*, **13**, page 173]

(a) Identify which period has the highest average number of sedentary bouts lasting 20 minutes. [1]

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(b) State what happens to the standard deviation of sedentary bouts after school, as the time increases. [1]

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(c) Calculate the total for the average number of sedentary bouts during school. [2]

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(Option C continues on the following page)

(Option C, question 7 continued)

(d) Discuss how a lifestyle of physical inactivity increases the risk of cardiovascular disease. [3]

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8. (a) State **two** hypokinetic diseases. [2]

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(b) Discuss the relationship between major societal changes and hypokinetic disease. [3]

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(Option C continues on the following page)

(Option C continued)

9. (a) Distinguish between type 1 and type 2 diabetes. [1]

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(b) Outline the major risk factors for type 2 diabetes. [3]

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10. (a) Define the term *mood*. [1]

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(b) Explain the role of exercise in reducing the effects of depression. [3]

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End of Option C

Option D — Nutrition for sport, exercise and health

11. A nutrition study investigated the effect of dietary supplement (DS) intake on individual and team sport athletes.

Figure A shows the percentage of athletes who take dietary supplements and have a low, medium or high training volume.

Figure B shows the percentage of athletes who take dietary supplements and whether they participate or not at national level.

Figure A

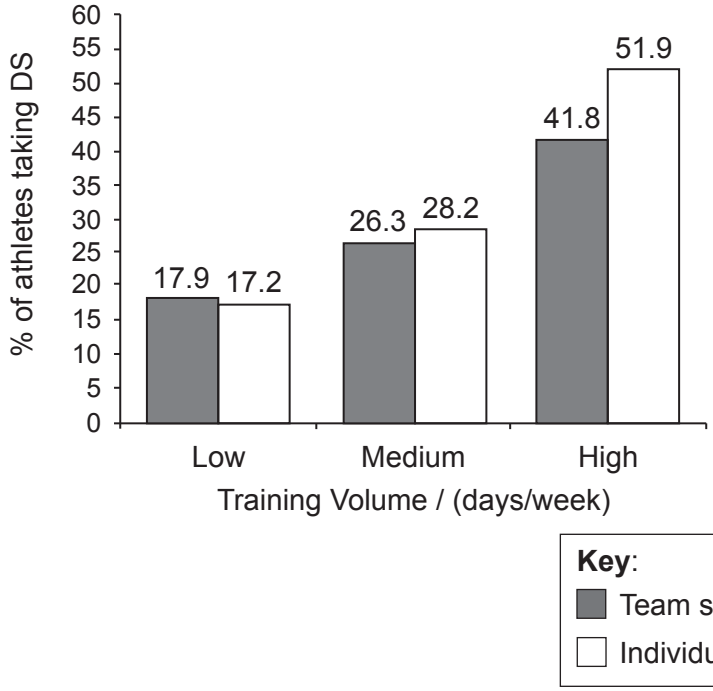
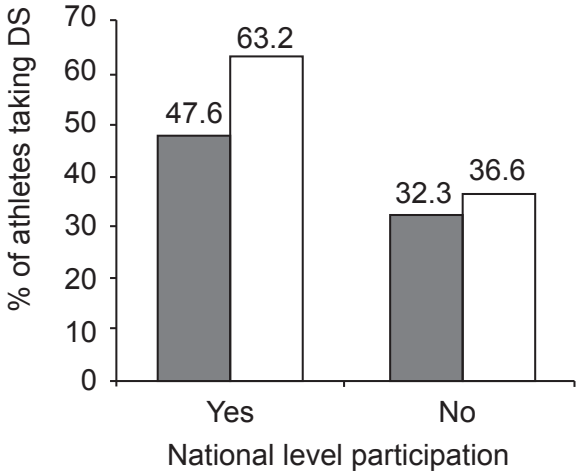
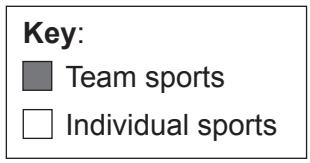


Figure B





[Source: Reprinted from *Journal of Sports Science and Medicine*, Vol 12, I Giannopoulou *et al.*, "Performance Level Affects the Dietary Supplement Intake of Both Individual and Team Sports Athletes", pages 190–196, copyright (2013), with permission from the JOURNAL OF SPORTS SCIENCE AND MEDICINE.]

(a) Identify which training volume and type of sport (individual or team) has over 50 % of athletes who take dietary supplements. [1]

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(Option D continues on the following page)

(Option D, question 11 continued)

(b) State what influence national level participation has on dietary supplement intake. [1]

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(c) Calculate the percentage difference between individual and team sport athletes with national level participation who use dietary supplements. [2]

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(d) Discuss the use of bicarbonate to improve anaerobic sport performance. [3]

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(Option D continues on the following page)

(Option D continued)

12. (a) List **two** enzymes responsible for the digestion of protein in the human body. [2]

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(b) Using an example, explain how the components of a negative feedback mechanism help maintain homeostasis. [3]

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13. (a) State **two** reasons why humans cannot live without water for a prolonged time. [2]

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(b) Outline the body composition requirements of marathon runners. [2]

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(Option D continues on the following page)

(Option D continued)

14. (a) Define the term *glycemic index*. [1]

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(b) Discuss the implications of training on the recommended protein intake for athletes. [3]

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End of Option D

Please **do not** write on this page.

Answers written on this page
will not be marked.