

Sports, exercise and health science
Standard level
Paper 3

Friday 11 May 2018 (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.
- Answers must be written within the answer 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 – 7
Option C — Physical activity and health	8 – 11
Option D — Nutrition for sport, exercise and health	12 – 15



Option A — Optimizing physiological performance

1. A professional cyclist was tested prior to competing in the Tour de France. His results for body composition, maximal oxygen uptake, and peak power output in 2005 and 2013 are shown in the table.

	2005	2013
Body mass (kg)	76.6	71.3
Total body fat (kg)	12.9	6.9
Total body fat (% of mass)	16.9	9.8
VO ₂ peak (mL kg ⁻¹ min ⁻¹)	80.2	84.6
Peak power output (W)	547.0	529.3
Relative peak power output (W kg ⁻¹)	7.1	7.5

- (a) Identify the year in which the cyclist had a higher total body fat percentage. [1]

.....
.....

- (b) Calculate the difference between total body fat percentage in 2005 and 2013. [2]

.....
.....
.....
.....

- (c) The cyclist won the Tour de France for the second time in 2013. Using the data in the table, suggest why he won the race. [2]

.....
.....
.....
.....

(Option A continues on the following page)



(Option A continued)

2. (a) Describe how an athlete forms sweat in order to maintain body temperature during exercise.

[3]

.....

.....

.....

.....

.....

.....

(b) Explain how humidity affects the evaporation of sweat.

[2]

.....

.....

.....

.....

(c) Discuss the relationship between the production of heat and the use of ATP during exercise.

[2]

.....

.....

.....

.....

(Option A continues on page 5)



20EP03

Turn over

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

Answers written on this page
will not be marked.



20EP04

(Option A continued)

3. (a) State why the placebo effect can improve performance. [1]

.....
.....

(b) Using an example, outline a macrocycle in a training programme. [3]

.....
.....
.....
.....
.....
.....

(c) Discuss the benefits and health risks for endurance athletes using erythropoietin (EPO). [4]

.....
.....
.....
.....
.....
.....
.....
.....
.....

End of Option A

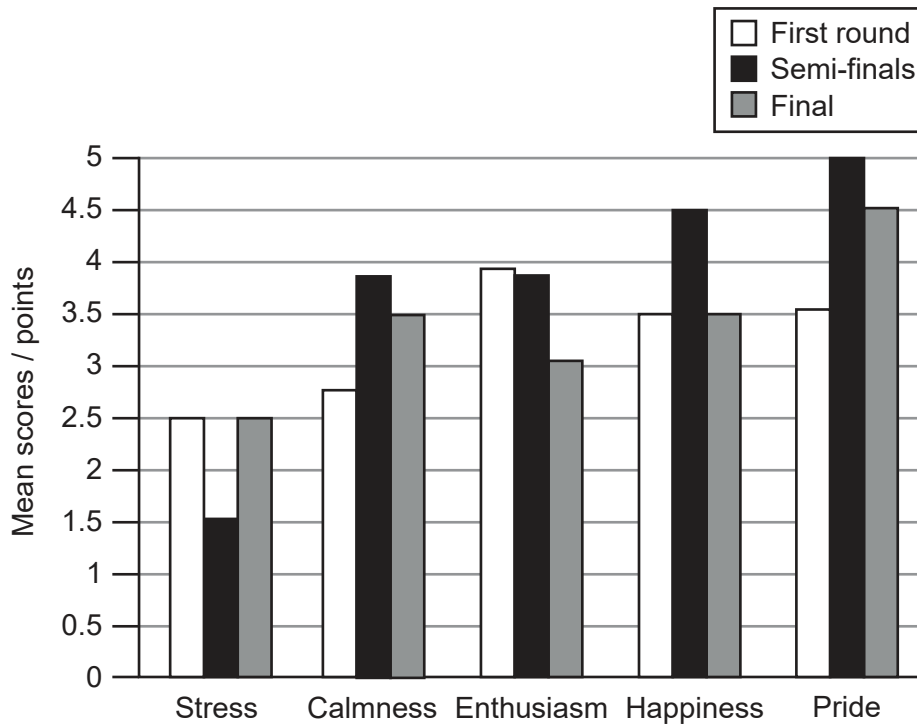


20EP05

Turn over

Option B — Psychology of sport

- 4. A study assessed the range and intensity of emotions experienced by referees during the World Lacrosse Championship. Their emotions were recorded on a 5-point rating scale ranging from 0 (no emotions) to 5 (extreme emotions) before the first round, semi-finals and final. The mean scores for different emotions are shown in the bar chart.



[Source: Adapted from Andrew P. Friesen, Tracey J. Devonport & Andrew M. Lane (2017) Beyond the technical: The role of emotion regulation in lacrosse officiating, *Journal of Sports Sciences*, 35:6, 579-586, DOI: 10.1080/02640414.2016.1180419. Reprinted by permission of the publisher Taylor & Francis Ltd, <http://www.tandfonline.com>.]

- (a) Identify the emotion with the highest mean score in the final. [1]

.....

.....

- (b) Calculate the difference between semi-finals and final mean score for the emotion identified in part (a). [2]

.....

.....

.....

.....

(Option B continues on the following page)



(Option B, question 4 continued)

- (c) Using the data in the bar chart, compare and contrast the mean scores for stress and happiness. [2]

.....

.....

.....

.....

.....

.....

- 5. (a) Define *anxiety*. [1]

.....

.....

- (b) Outline catastrophe theory. [2]

.....

.....

.....

.....

- 6. (a) Outline intrinsic motivation as it relates to exercise. [2]

.....

.....

.....

.....

(Option B continues on the following page)



20EP07

Turn over

(Option B, question 6 continued)

- (b) Explain how extrinsic motivators can positively impact a 400 m sprinter preparing for a competition.

[2]

.....

.....

.....

.....

7. (a) Describe how the attribution of success allows a soccer player to use self-serving bias to experience positive emotions.

[2]

.....

.....

.....

.....

- (b) Explain how a soccer coach uses social learning theory when they demonstrate a skill to be learnt.

[3]

.....

.....

.....

.....

.....

.....

(Option B continues on the following page)



20EP08

(Option B, question 7 continued)

- (c) Suggest changes to the skills that take place during the practice phase of psychological skills training.

[3]

.....

.....

.....

.....

.....

.....

End of Option B

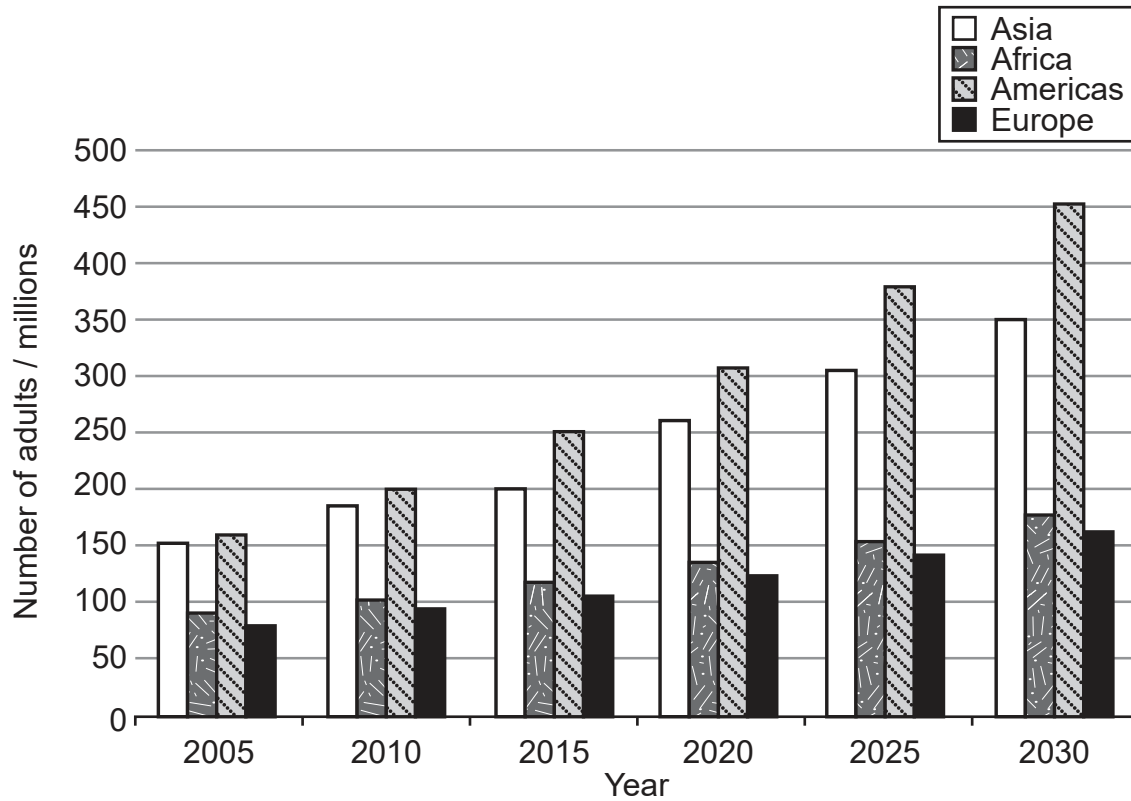


20EP09

Turn over

Option C — Physical activity and health

8. The numbers of adults with hypokinetic disease were recorded during 2005, 2010, and 2015 for four different regions. The information was used to estimate the numbers for 2020, 2025 and 2030. The results are shown in the bar chart.



[Source: © International Baccalaureate Organization 2018]

- (a) Identify the region with the highest number of adults with hypokinetic disease in 2015. [1]

.....

.....

- (b) For the region identified in part (a), calculate the estimated increase in millions in the number of adults with hypokinetic disease from 2015 to 2030. [2]

.....

.....

.....

.....

(Option C continues on the following page)



20EP10

(Option C, question 8 continued)

(c) Suggest **two** possible reasons for the trend in the bar chart. [2]

.....

.....

.....

.....

9. (a) List **two** health risks of diabetes. [2]

.....

.....

.....

.....

(b) Predict possible cardiovascular consequences resulting from a lifestyle of physical inactivity. [2]

.....

.....

.....

.....

10. (a) Outline **one** strategy for enhancing adherence to exercise. [1]

.....

.....

(Option C continues on the following page)



(Option C, question 10 continued)

(b) Explain how exercise can reduce depression.

[3]

.....

.....

.....

.....

.....

.....

.....

.....

11. (a) Outline **two** recommended levels of aerobic physical activity for adults aged 65 and above.

[2]

.....

.....

.....

.....

(b) Identify long-term consequences of osteoporotic fractures.

[2]

.....

.....

.....

.....

(Option C continues on the following page)



(Option C, question 11 continued)

(c) Discuss physical health barriers to exercise for adults aged 65 and above.

[3]

.....

.....

.....

.....

.....

.....

End of Option C



20EP13

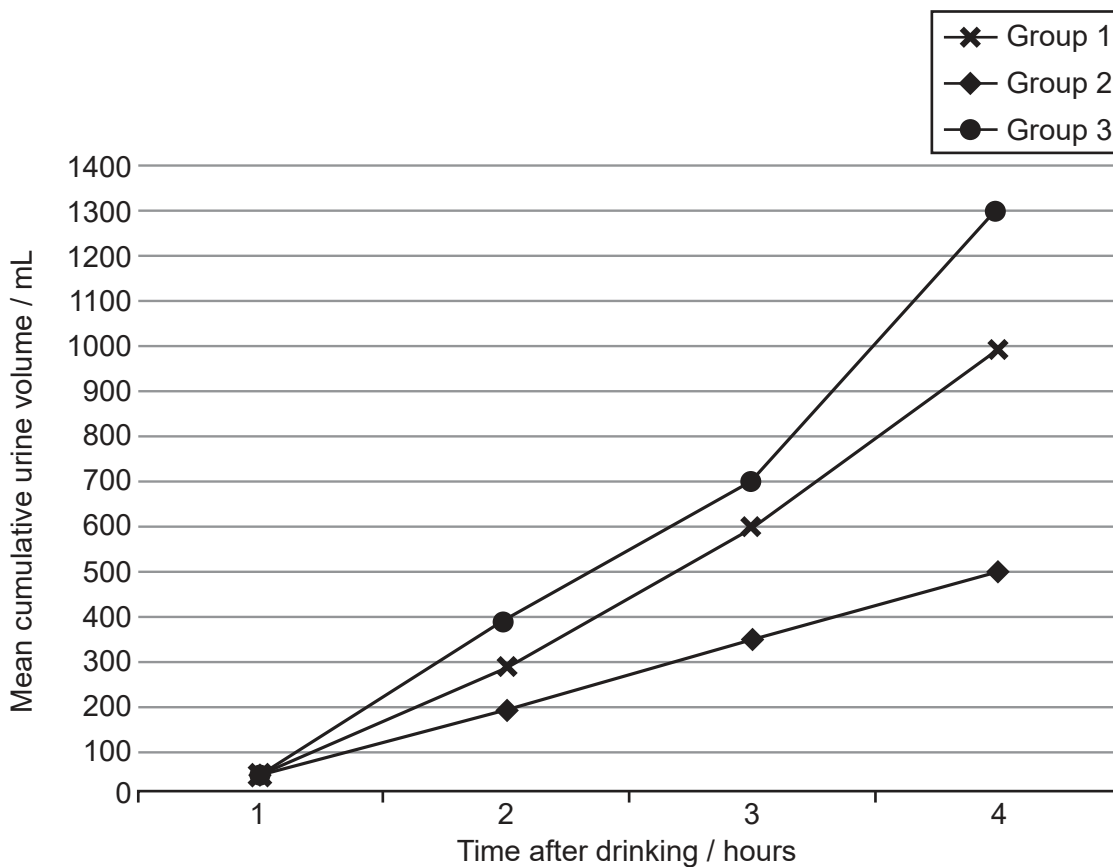
Turn over

Option D — Nutrition for sport, exercise and health

12. A group of runners was involved in a study on post-exercise rehydration. Participants were randomly assigned to one of three groups according to the type of drink they were given:

- Group 1: Carbohydrate-electrolyte
- Group 2: Carbohydrate-electrolyte plus whey protein
- Group 3: Carbohydrate-electrolyte plus casein protein.

The graph shows the mean cumulative volume of urine produced, measured every hour for four hours.



[Source: Adapted from *Journal of Exercise Science and Fitness*, Vol 13 issue 1, L Liang *et al.* Effects of protein addition to carbohydrate–electrolyte solutions on postexercise rehydration, pp 8-15. Copyright 2015, with permission from Elsevier.]

(a) Identify the group with the smallest mean cumulative volume of urine produced at three hours after drinking.

[1]

.....

.....

(Option D continues on the following page)



20EP14

(Option D, question 12 continued)

- (b) Calculate the difference between the mean cumulative volume of urine produced for groups 1 and 3 after three hours. [2]

.....

.....

.....

.....

- (c) Using the data on the graph, deduce why the carbohydrate electrolyte drink with whey protein is the most effective hydration method. [2]

.....

.....

.....

.....

- 13. (a) Define *basal metabolic rate*. [1]

.....

.....

- (b) Outline **two** features of the stomach. [2]

.....

.....

.....

.....

(Option D continues on the following page)



(Option D continued)

14. (a) Outline **two** conditions that are required for enzymes to work efficiently. [2]

.....

.....

.....

.....

(b) Explain the role of enzymes during digestion of macronutrients. [3]

.....

.....

.....

.....

.....

.....

15. (a) Identify **two** reasons why individuals require water. [2]

.....

.....

.....

.....

(b) Suggest why the use of creatine is beneficial during a resistance training programme. [2]

.....

.....

.....

.....

(Option D continues on the following page)



20EP16

(Option D continued)

- (c) Explain the role of antidiuretic hormone (ADH) in maintaining water balance of the blood when body fluid levels are low.

[3]

.....

.....

.....

.....

.....

.....

End of Option D



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

Answers written on this page
will not be marked.



20EP18

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

Answers written on this page
will not be marked.



20EP19

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

Answers written on this page
will not be marked.



20EP20