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**Sports, exercise and health science**  
**Standard level**  
**Paper 3**

5 November 2025

**Zone A** afternoon | **Zone B** afternoon | **Zone C** afternoon

Candidate session number

1 hour

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**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 sports	4 – 6
Option C — Physical activity and health	7 – 10
Option D — Nutrition for sports, exercise and health	11 – 14



**Option A — Optimizing physiological performance**

1. A study investigated the effect of a 15-day heat acclimatization protocol on resting heart rate (RHR), end-of-training core temperature (ETc) and resting core temperature (RTc) during ultramarathon running. The data recorded is presented in **Figure 1**.

**Figure 1: Physiological adaptations over the 15-day acclimatization period**

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**(Option A continues on the following page)**



**(Option A, question 1 continued)**

- (a) (i) Identify the day with the lowest resting heart rate (beats min<sup>-1</sup>). [1]

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- (ii) Calculate the difference in RT<sub>c</sub> (°C) between the start and the end of the 15-day acclimatization protocol. [1]

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- (iii) Comment on the effectiveness of the 15-day acclimatization protocol. [3]

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- (b) Describe how an athlete should acclimatize to heat stress. [3]

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**(Option A continues on the following page)**



**(Option A continued)**

2. (a) Define *training*. [1]

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(b) Discuss possible indicators of overtraining. [3]

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(c) Analyse the three cycles within periodization. [3]

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**(Option A continues on the following page)**



**(Option A continued)**

3. (a) Anabolic steroids are commonly abused drugs in sports. List **two** other non-nutritional ergogenic aids that are currently banned by the International Olympic Committee (IOC) and the World Anti-Doping Agency (WADA). [2]

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- (b) Discuss why pharmacological substances appear on the list of banned substances. [3]

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**End of Option A**



**Option B — Psychology of sports**

4. A study asked athletes to complete a cross-sectional online questionnaire during a period of social distancing. The questionnaire asked the athletes if their motivation to exercise changed from before to during the social distancing. The results from the questionnaire were assessed to determine change in motivation. The number of athletes with lower motivation, unchanged motivation and higher motivation are presented in the table.

**Table 1: Change in motivation to exercise**

		Lower	Unchanged	Higher
Gender	Female	23	15	13
	Male	10	24	10
Type of sport	Individual	15	20	10
	Team	15	17	11
	Both	2	2	0

- (a) (i) Identify the number ( $n$ ) of team athletes with unchanged motivation to exercise. [1]

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- (ii) Calculate how many female athletes ( $n$ ) completed the questionnaire. [1]

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- (iii) Comment on the motivation to exercise for the different types of sports from before and during social distancing. [3]

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(Option B continues on the following page)



**(Option B, question 4 continued)**

(b) Define the term *motivation*.

[1]

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(c) Atkinson's model of achievement motivation suggests that athletes can be motivated in one of two ways. Describe the need to achieve characteristics linked to Atkinson's model of achievement motivation.

[4]

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**(Option B continues on the following page)**



**(Option B continued)**

5. (a) Distinguish between state and trait anxiety. [2]

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(b) State the test used to measure trait anxiety. [1]

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(c) Discuss **three** uses of mental imagery with examples from sport. [3]

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**(Option B continues on the following page)**



**(Option B continued)**

6. Outline **two** relaxation techniques, providing examples for each.

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**End of Option B**



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**Turn over**

**Option C — Physical activity and health**

- 7. Data on characteristics of populations and health systems was collected. The data presents the population characteristics, cardiovascular disease (CVD) and diabetes rates of five countries labelled A, B, C, D and E.

**Table 2: Population data from five countries**

	Countries				
	A	B	C	D	E
<b>Population characteristics</b>					
Population / millions	161.9	1311.0	28.5	189.0	21.0
Rural population / %	65.7	67.3	81.4	61.2	81.6
Life expectancy at birth / years	71.6	68.0	69.6	66.2	74.8
Diabetes / age standardised %	9.2	8.3	9.5	12.1	7.6
<b>Age standardised CVD and diabetes death rates</b>					
CVD death rate per 100 000	363.9	352.6	295.2	530.9	239.9
CVD death rate / % of total deaths	36.5	30.4	29.6	44.0	38.0
Diabetes death rate per 100 000 in 2015	67.1	43.3	35.7	53.0	50.9
Diabetes death rate / % of total deaths	6.7	3.7	3.6	4.4	8.1

- (a) (i) Identify the country with the highest percentage of total deaths from cardiovascular disease (CVD).

[1]

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- (ii) Calculate the difference in percentage (%) of total diabetes deaths between country B and C.

[1]

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(Option C continues on the following page)



**(Option C, question 7 continued)**

(iii) Comment on the hypothesis that countries with a greater rural population (%) have a higher percentage death rate from diabetes. [3]

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(b) Describe habitual physical activity. [2]

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(c) Hypokinetic diseases have become more prevalent in the past 50 years. Discuss the relationship between the increase in hypokinetic diseases and major societal changes. [3]

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**(Option C continues on the following page)**



**(Option C continued)**

8. Athletic amenorrhea can lead to osteoporosis. Discuss **three** other major risk factors for osteoporosis.

[3]

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9. (a) Define the term *mood*.

[1]

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(b) Outline how exercise helps change mood states.

[3]

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**(Option C continues on the following page)**



**(Option C continued)**

- 10.** Individuals encounter barriers to activity even though they understand the health benefits involved. Discuss potential environmental barriers to physical activity. [3]

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**End of Option C**



**Option D — Nutrition for sports, exercise and health**

11. A study investigated the effect of an electrolyte sports drink on blood markers in a group of trained individuals.

Participants consumed an electrolyte sports drink during each training session of a 4-week training programme. Electrolytes and hematocrit (volume percentage of red blood cells in the blood) were measured prior to (baseline) and after (post) the 4-week programme. The results are presented in the table.

**Table 3: Changes in blood indices before and after rehydration**

Blood index	Baseline	Post 4 weeks	P value
Sodium ion / mmolL <sup>-1</sup>	140.1546	141.2305	0.083
Chloride ion / mmolL <sup>-1</sup>	105.2481	104.7825	0.264
Potassium ion / mmolL <sup>-1</sup>	4.2351	4.0345	0.051
Calcium ion / mmolL <sup>-1</sup>	2.3648	2.3700	0.190
Hematocrit / %	35.9010	35.6547	0.660

- (a) (i) Identify the electrolyte with the lowest baseline blood level. [1]

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- (ii) Calculate the difference in hematocrit (%) between the baseline and post 4 weeks. [1]

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(Option D continues on the following page)



**(Option D, question 11 continued)**

(iii) Comment on the blood index following a 4-week electrolyte consumption programme.

[3]

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(b) Describe how athletes can monitor hydration status during physical activity.

[2]

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(c) When athletes become dehydrated, the body will try to retain water. Explain how antidiuretic hormone (ADH) aids in maintaining the water balance of the blood.

[4]

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**(Option D continues on the following page)**



**(Option D continued)**

12. Basal metabolic rate is one component of energy expenditure. State **one** other component of energy expenditure. [1]

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13. Athletes use sports drinks, bars and gels as nutritional ergogenic aids. Evaluate their use. [3]

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**(Option D continues on the following page)**



**(Option D continued)**

**14.** (a) State the value for low glycemic index (GI) foods. [1]

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(b) Explain the relevance of glycemic index (GI) to carbohydrate consumption pre- and post-competition. [4]

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**End of Option D**

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#### References:

4. Copyright © 2021 Lautenbach, Leisterer, Walter, Kronenberg, Manges, Leis, Pelikan, Gebhardt and Elbe. Amateur and Recreational Athletes' Motivation to Exercise, Stress, and Coping During the Corona Crisis. *Front. Psychol.* 11:611658. <https://doi.org/10.3389/fpsyg.2020.611658>. Licensed under BY CC 4.0 <https://creativecommons.org/licenses/by/4.0/>. Source adapted.
7. Used with permission of BMJ Publishing Group Ltd, from "Diabetes, Cardiovascular Disease, and Chronic Kidney Disease in South Asia: Current Status and Future Directions", Misra, Anoop, et al., vol. 357, 2017. Permission conveyed through Copyright Clearance Center, Inc., 2025.
11. Yang, Z. and Xia, S., 2020. The Effect of Exercise Fluid Supplement on Human Metabolism after Load Exercise. *Journal of Coastal Research*, 104, pp. 504–507. [e-journal] Available at: <https://www.jstor.org/stable/48640960>. [Accessed 7 March 2023.] Source adapted.



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