



22146603

**SPORTS, EXERCISE AND HEALTH SCIENCE
STANDARD LEVEL
PAPER 3**

Candidate session number

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Thursday 8 May 2014 (afternoon)

Examination code

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.
- 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 – 9
Option D — Nutrition for sport, exercise and health	10 – 13



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Option A — Optimizing physiological performance

1. A study compared a block versus a traditional training programme for two groups of cyclists of equal ability over a four-week training period. The block group participated in five days of high-intensity training (HIT) followed by three weeks of training made up of one HIT day and four low-intensity training (LIT) days per week. The traditional group participated in two HIT days and three LIT days per week during their four-week training period.

Figure 1(a) shows the mean peak power output and Figure 1(b) shows the maximal oxygen consumption pre (before) and post (after) the four-week training period for both groups.

Figure 1(a)

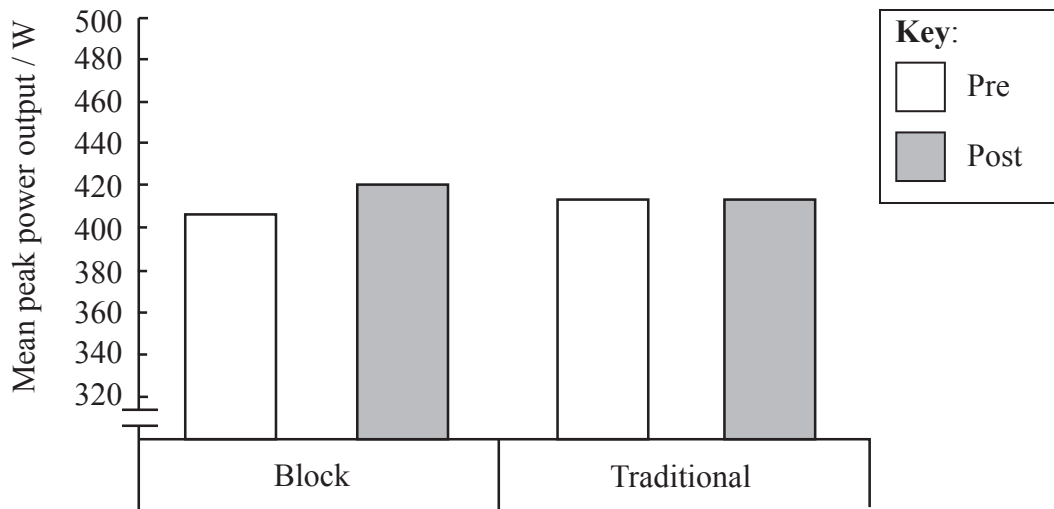
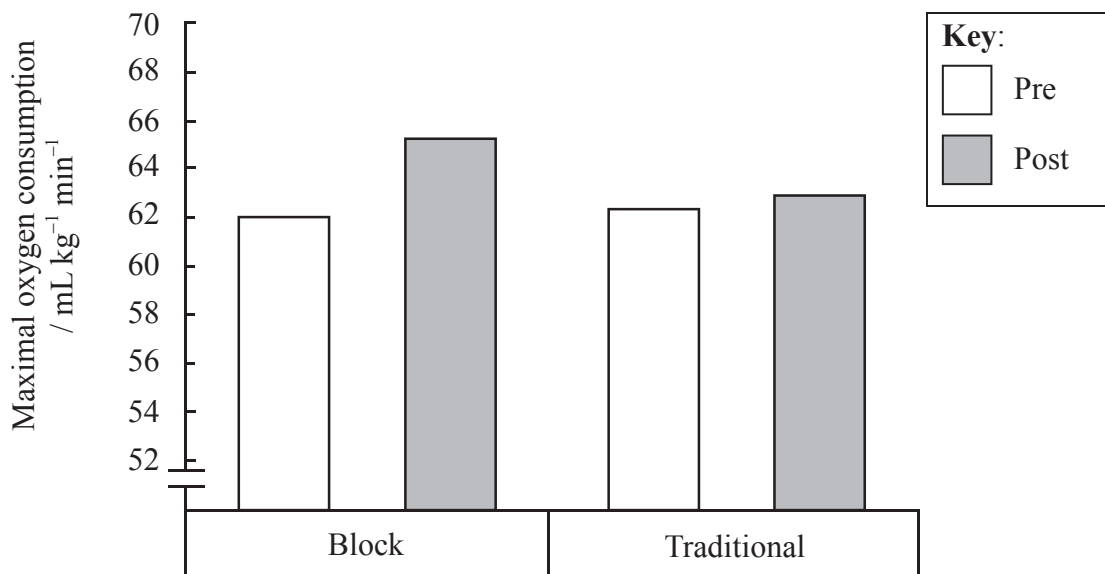


Figure 1(b)



[Source: BR Ronnestad, J Hansen, S Ellefsen, (2012), *Scandinavian Journal of Medicine and Science in Sports*, available from onlinelibrary.wiley.com, [Accessed July 2013]]

(Option A continues on the following page)



(Option A, question 1 continued)

- (a) State, with appropriate units, the mean pre-training maximal oxygen consumption for the block group. [1]

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- (b) Identify, from pre to post-training, which group showed:

- (i) no difference in mean peak power output; [1]

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- (ii) a greater increase in maximal oxygen consumption. [1]

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- (c) Suggest how periodization should be organized to optimize performance and avoid overtraining. [3]

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(Option A continues on the following page)



(Option A continued)

2. (a) Describe precautions that should be taken during distance running in the extreme cold. [2]

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- (b) Outline the significance of humidity when playing soccer in a hot environment. [3]

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- (c) The Marathon des Sables is a six-day endurance running race across the Sahara desert. Describe **two** health risks associated with exercising in the heat. [3]

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(Option A continues on the following page)



(Option A continued)

3. (a) List **four** classes of non-nutritional ergogenic aids that are currently banned for athletes who will be competing in the 2016 Olympic and Paralympic Games. [2]

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2.
3.
4.

- (b) Discuss why the pharmacological substances, such as those listed in (a), appear on the list of banned substances for an Olympic judo player. [4]

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End of Option A



Turn over

Option B — Psychology of sport

4. A study investigated the daily amount of physical activity of two groups of children in North America. Accelerometers were used to measure physical activity. A questionnaire was used to record scores for self-confidence and social support (encouragement from parents and teachers) to participate in daily physical activity.

The mean (\pm SD) physical activity time per day and questionnaire scores are shown in the table below. A higher questionnaire score indicates more self-confidence and social support.

	Group 1	Group 2
daily physical activity / minutes	40.3 (\pm 6.9)	14.8 (\pm 7.1)
self-confidence	3.8 (\pm 0.5)	1.9 (\pm 0.4)
social support	3.6 (\pm 0.5)	1.7 (\pm 0.5)

[Source: adapted from Z Gao, (2012), *Psychology, Health & Medicine*, 17(5), pages 542–550]

- (a) Identify which group:

- (i) has lower self-confidence to participate in daily physical activity;

[1]

.....

- (ii) has more encouragement from parents and teachers to participate in daily physical activity.

[1]

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(Option B continues on the following page)



(Option B, question 4 continued)

- (b) State which group has more variability in time spent on daily physical activity. [1]

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- (c) Discuss how social learning theory can help a physical education teacher promote physical activity in children. [3]

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(Option B continues on the following page)



(Option B continued)

5. (a) Distinguish between intrinsic and extrinsic motivation during a sports competition. [4]

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- (b) Outline the negative effects of an outcome orientation when judging your own success in sport. [3]

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(Option B continues on the following page)



(Option B continued)

6. (a) Identify **one** method to measure anxiety. [1]

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- (b) Describe how cognitive anxiety can cause poor performance in tennis. [3]

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- (c) Explain how psychological skills training (PST) can be used to improve performance. [3]

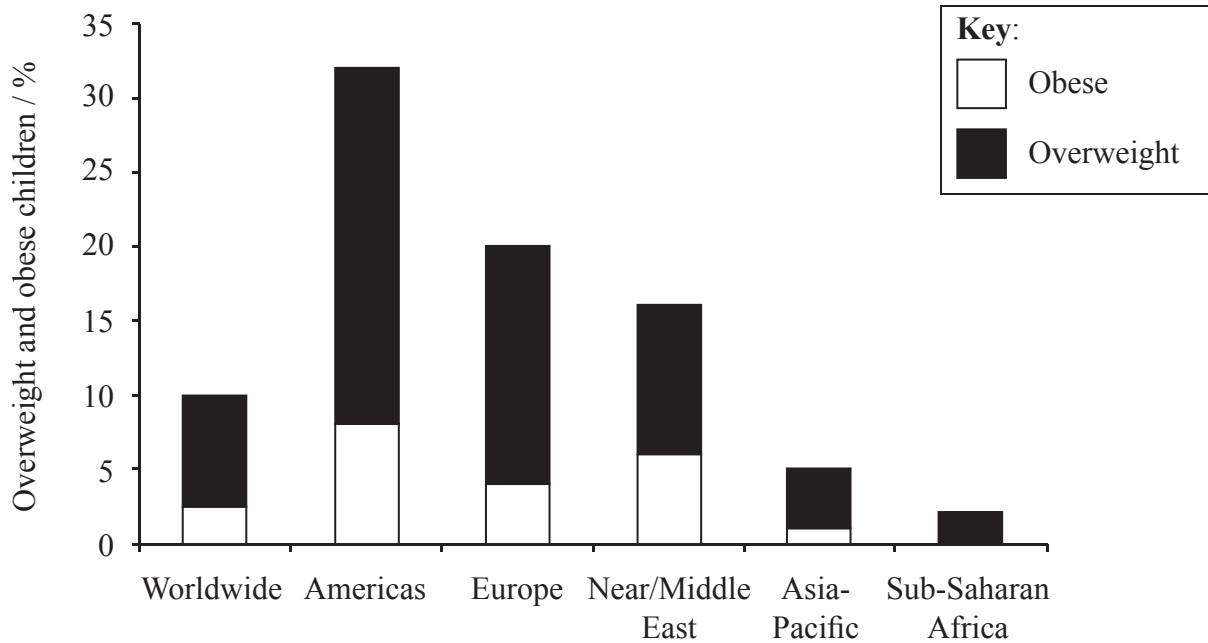
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End of Option B



Option C — Physical activity and health

7. The World Health Organization recently estimated that 1.9 million people die each year as a result of physical inactivity. Additionally, 2.6 million people die as a result of being overweight or obese. The graph below shows worldwide and regional percentages of overweight and obese children.



[Source: Katzmarzyk *et al.*, (2008), *International Journal of Pediatric Obesity*, 3, pages 3–21]

(a) State the worldwide combined percentage of overweight and obese children. [1]

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(Option C continues on the following page)



(Option C, question 7 continued)

(b) Identify which region has the:

(i) lowest percentage of obese children;

[1]

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(ii) highest percentage of overweight children.

[1]

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(c) Discuss the concept of energy balance.

[3]

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(Option C continues on the following page)



(Option C continued)

8. (a) Distinguish between the terms habitual physical activity and exercise. [2]

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- (b) Define the term *hypokinetic disease*. [1]

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- (c) A recent study found that taxi drivers may have a high risk of developing cardiovascular disease. Discuss how a lifestyle of physical inactivity increases the risk factors for cardiovascular disease. [3]

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- (d) Outline **one** strategy for enhancing adherence to exercise. [1]

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(Option C continues on the following page)



(Option C continued)

9. (a) Outline how chemical signals affect appetite regulation. [3]

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- (b) Explain the relationship between physical activity and bone health. [4]

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End of Option C



Option D — Nutrition for sport, exercise and health

- 10. A study examined the effects of the frequency of training in 11, 13 and 15-year-old Finnish soccer players. Players were divided into two groups: A and B. Group A trained four times per week and Group B trained once per week.

The mean (SD) body composition (body fat), sprinting speed (30m sprint), and maximal oxygen uptake (VO₂ max) are shown in the table below.

Age / yrs	Fat / %		30 m sprint / seconds		VO ₂ max / ml min ⁻¹ kg ⁻¹	
	Group A	Group B	Group A	Group B	Group A	Group B
11	9.2 (3.4)	16.8 (6.6)	5.3 (0.2)	5.7 (0.5)	52.3 (3.1)	46.9 (3.9)
13	10.1 (4.1)	16.7 (6.9)	4.9 (0.3)	5.4 (0.4)	53.7 (3.5)	47.7 (3.2)
15	9.9 (6.6)	13.0 (6.6)	4.6 (0.2)	5.0 (0.2)	54.4 (4.9)	48.3 (34.4)

[Source: Vanttinen *et al.*, (2011), *Journal of Strength and Conditioning Research*, 25(12), pages 3342–3351]

- (a) State the age and group with:

- (i) the lowest VO₂ max;

[1]

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- (ii) the fastest 30 m sprint time.

[1]

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(Option D continues on the following page)



(Option D, question 10 continued)

- (b) Calculate the difference in mean percentage body fat for Group B from age 11 to 15 years. [1]

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- (c) With reference to the data and your own knowledge, discuss the association between body composition and athletic performance. [3]

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11. (a) State the typical pH values found in the small intestine. [1]

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- (b) Distinguish between the digestive function of pancreatic amylase and pancreatic lipase. [2]

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(Option D continues on the following page)



(Option D continued)

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

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(b) Identify **one** method to monitor the hydration status of an athlete. [1]

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(c) Discuss the regulation of electrolyte balance during prolonged exercise. [2]

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(Option D continues on the following page)



(Option D continued)

13. (a) Explain why foods with different glycemic index (GI) values influence carbohydrate intake for a professional soccer player after a game. [2]

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- (b) Discuss the protein needs of athletes training for an Olympic weightlifting competition. [4]

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End of Option D



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20EP20