5.5 Health, Fitness and Wellbeing: Diet, Energy Balance and Performance: 30-minute Pack

AQA 8582 · Calculator allowed · about 30 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Which of the following best describes the main purpose of carbohydrate loading?

- ☐ A) To maximise glycogen stores before a long, continuous aerobic event
- ☐ B) To increase muscle mass as quickly as possible
- ☐ C) To reduce the amount of water a performer needs to drink
- ☐ D) To replace the need for a warm-up before exercise

(Total for Question 1 is 1 mark)

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2 Which of the following best describes why a performer's diet should generally reflect the total amount and type of training they are doing?

- ☐ A) Because energy needs are matched to the demands of training, rather than being fixed for every performer
- ☐ B) Because every performer needs exactly the same amount of carbohydrate regardless of training
- ☐ C) Because diet has no effect on training or recovery
- ☐ D) Because energy expenditure does not change with training volume

(Total for Question 2 is 1 mark)

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3 State two factors that can affect how much energy a performer needs to consume each day.

(Total for Question 3 is 2 marks)

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4 Which of the following statements about energy balance is correct?

- ☐ A) Energy balance compares a performer's energy intake with their energy expenditure over a period of time
- ☐ B) Energy balance only applies to performers in endurance sports
- ☐ C) Energy balance is fixed and does not change with training volume
- ☐ D) Energy balance measures a performer's muscular strength

(Total for Question 4 is 1 mark)

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5 Discuss how Priya, a marathon runner, might adjust her diet in the days before, during and immediately after a marathon, referring to energy balance and the role of carbohydrate, and evaluate why matching dietary strategy to the specific demands of the event, rather than following a generic approach, matters for her performance.

(Total for Question 5 is 9 marks)

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6 State what is meant by each of the following terms.

(a) Energy intake. **(1)**

(b) Energy expenditure. **(1)**

(c) Energy balance. **(1)**

(Total for Question 6 is 3 marks)

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7 A performer's energy balance can be described using the formula energy balance = energy intake - energy expenditure.

(a) State what is meant by an 'energy surplus' and an 'energy deficit'. **(2)**

(b) Using the formula given, explain why a performer's energy needs typically increase on days with a heavy training session. **(2)**

(Total for Question 7 is 4 marks)

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8 Which of the following situations describes an energy deficit?

- ☐ A) Energy intake of 2800 kcal, energy expenditure of 2500 kcal
- ☐ B) Energy intake of 2500 kcal, energy expenditure of 2800 kcal
- ☐ C) Energy intake of 2800 kcal, energy expenditure of 2800 kcal
- ☐ D) Energy intake and energy expenditure both increasing by the same amount

(Total for Question 8 is 1 mark)

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9 State what is meant by 'carbohydrate loading'.

(Total for Question 9 is 2 marks)

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10 State two reasons why the timing of a performer's meal before competition matters.

(Total for Question 10 is 2 marks)

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11 Explain one reason why a strength/power athlete's dietary priorities, for example around protein intake, might differ from an endurance athlete's.

(Total for Question 11 is 2 marks)

12 A rower's estimated energy expenditure for a training day is 3200 kcal. Using the formula energy balance = energy intake - energy expenditure, calculate their energy intake on a day when their energy balance is a surplus of 200 kcal.

(Total for Question 12 is 2 marks)

13 Suggest and justify one change Chen could make to his carbohydrate intake in the days before the event, referring to glycogen storage.

(Total for Question 13 is 3 marks)

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Mark scheme · 5.5 Health, Fitness and Wellbeing: Diet, Energy Balance and Performance: 30-minute Pack

Question 1

A **B1**

Answer: A

Question 2

A **B1**

Answer: A

Question 3

the volume and intensity of their training, oe **B1**

their overall body size, oe **B1**

Answer: The volume and intensity of a performer's training, and their overall body size, can both affect how much energy they need to consume each day.

Question 4

A **B1**

Answer: A

Question 5

Level 3 A detailed and coherent response that accurately explains dietary adjustments before, during and after the marathon, referring correctly to energy balance and carbohydrate's role, applies them specifically to Priya's event, and reaches a well-justified evaluative judgement about why event-specific matching matters. Sustained, accurate use of nutrition terminology throughout. **7-9**

Level 2 Some accurate coverage of dietary adjustments across at least two of the three phases (before/during/after), with some application to Priya's event, though coverage may be incomplete or the evaluative judgement underdeveloped. Generally correct use of terminology. **4-6**

Level 1 Basic or generic statements about diet and marathon running with little or no reference to specific phases or energy balance, and little evaluation of event-specific matching. **1-3**

Level 0 No relevant content. **0**

Indicative content:

- Before: carbohydrate loading in the preceding days to maximise glycogen stores in the muscles and liver.
- During: possible carbohydrate intake (e.g. gels or sports drinks) during the race itself, to delay glycogen depletion over the several hours of continuous running.
- After: carbohydrate and protein intake soon after finishing, to support glycogen replenishment and muscle repair during recovery.
- Energy balance point: overall daily energy intake needs to reflect the very high energy expenditure of marathon training and racing, to avoid an unplanned, large energy deficit.
- Evaluative point: a generic dietary approach not matched to the marathon's specific duration and intensity (for example, a strategy designed around a short sprint event) would not adequately fuel a multi-hour continuous aerobic effort.
- Evaluative point: strategies therefore need to be matched to the specific demands (duration, intensity, continuous versus intermittent effort) of the event in question, rather than following a single approach for every performer or every event.
- Balanced conclusion: the three phases work together as a single fuelling plan across the whole event, rather than as separate, unrelated decisions.

Question 6

(a) the total energy consumed through food and drink, oe **B1**

(a) Answer: The total energy consumed through food and drink.

(b) the total energy used by the body, through daily bodily functions (basal metabolism) plus physical activity, oe **B1**

(b) Answer: The total energy used by the body, through daily bodily functions plus physical activity.

(c) the relationship/comparison between a person's energy intake and their energy expenditure over a period of time, oe **B1**

(c) Answer: The relationship between a person's energy intake and their energy expenditure over a period of time.

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Question 7

(a) energy surplus: when energy intake is greater than energy expenditure over a period, oe **B1**

(a) energy deficit: when energy intake is less than energy expenditure over a period, oe **B1**

(a) Answer: An energy surplus is when energy intake is greater than energy expenditure over a period; an energy deficit is when energy intake is less than energy expenditure over a period.

(b) a heavy training session increases the energy expenditure side of the equation, through the activity itself and the demands of recovery, oe **B1**

(b) so more energy intake is generally needed on that day to keep the same energy balance, compared with a lighter training day, oe **B1**

(b) Answer: A heavy training session increases the energy expenditure side of the equation, through the activity itself and the demands of recovery, so more energy intake is generally needed on that day to keep the same energy balance compared with a lighter training day.

Question 8

B **B1**

Answer: B

Question 9

a strategy, typically used before a long, continuous endurance event, of increasing carbohydrate intake, often alongside reduced training, in the days beforehand, oe **B1**

aimed at maximising the amount of glycogen stored in the muscles and liver before the event, oe **B1**

Answer: Carbohydrate loading is a strategy, typically used before a long, continuous endurance event, of increasing carbohydrate intake in the days beforehand, aimed at maximising the amount of glycogen stored in the muscles and liver.

Question 10

eating too close to the start can cause discomfort, as digestion is still in progress, oe **B1**

eating too long before, without a top-up snack, may leave energy stores lower by the start, oe **B1**

Answer: Eating too close to the start can cause discomfort as digestion is still in progress, and eating too long before, without a top-up snack, may leave energy stores lower by the start.

Question 11

strength/power training causes more muscle tissue breakdown that needs repairing and rebuilding, oe **B1**

so protein needs relative to training volume are generally higher, to support this muscle repair and adaptation, oe **B1**

Answer: Strength/power training causes more muscle tissue breakdown that needs repairing and rebuilding, so protein needs relative to training volume are generally higher, to support this muscle repair and adaptation.

Question 12

rearranges to energy intake = energy balance + energy expenditure, or 200 + 3200 seen, oe **M1**

3400 kcal cao **A1**

Answer: 3400 kcal.

Question 13

increasing carbohydrate intake in the 2-3 days before the event (carbohydrate loading), oe **B1**

this increases stored muscle and liver glycogen, providing a larger fuel reserve for the long duration of the event, oe **B1**

which can help delay fatigue caused by glycogen depletion later in the ride, oe **B1**

Answer: Chen could increase his carbohydrate intake in the 2-3 days before the event (carbohydrate loading). This increases stored muscle and liver glycogen, providing a larger fuel reserve for the long duration of the event, which can help delay fatigue caused by glycogen depletion later in the ride.

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