5.3 Health, Fitness and Wellbeing: Macronutrients - Carbohydrate, Fat and Protein: 30-minute Pack

AQA 8582 · Calculator allowed · about 30 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Which macronutrient provides the most energy per gram?

- [ ] A) Carbohydrate (approximately 4 kcal per gram)
- [ ] B) Protein (approximately 4 kcal per gram)
- [ ] C) Fat (approximately 9 kcal per gram)
- [ ] D) Fibre (approximately 2 kcal per gram)

(Total for Question 1 is 1 mark)

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2 Which of the following is an example of a complex carbohydrate food?

- [ ] A) Table sugar
- [ ] B) Wholegrain pasta
- [ ] C) Fruit juice
- [ ] D) A glucose sports gel

(Total for Question 2 is 1 mark)

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3 Which macronutrient provides approximately 9 kcal of energy per gram, more than double the value of the other two main macronutrients?

- [ ] A) Carbohydrate
- [ ] B) Protein
- [ ] C) Fat
- [ ] D) Water

(Total for Question 3 is 1 mark)

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4 Which nutrient is mainly responsible for the growth and repair of muscle tissue?

- [ ] A) Carbohydrate
- [ ] B) Protein
- [ ] C) Fat
- [ ] D) Water

(Total for Question 4 is 1 mark)

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5 Discuss the roles that carbohydrate, fat and protein each play in supporting Ben, a club-level cyclist preparing for a long-distance sportive lasting several hours, during his training and on the day of the event, and evaluate why an appropriate balance of all three macronutrients, rather than a focus on just one, best supports his training and performance.

(Total for Question 5 is 9 marks)

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6 State two food sources that are good sources of complex carbohydrate.

(Total for Question 6 is 2 marks)

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7 Which of the following best describes the role of glycogen in the body?

- ☐ A) A stored form of carbohydrate, kept in the muscles and liver for use as fuel
- ☐ B) A type of protein used for muscle repair
- ☐ C) A vitamin needed for bone health
- ☐ D) A fat-soluble energy reserve stored under the skin

(Total for Question 7 is 1 mark)

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8 State the main role in the body of each of the following macronutrients.

(a) Carbohydrate. **(1)**

(b) Fat. **(1)**

(c) Protein. **(1)**

(Total for Question 8 is 3 marks)

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9 State two functions of protein in the body.

.....

.....

(Total for Question 9 is 2 marks)

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10 Carbohydrates can be classified as simple or complex.

(a) Distinguish between simple and complex carbohydrates, giving an example of each. **(2)**

(b) Explain why complex carbohydrates are often used to provide a sustained energy release during exercise, compared with simple carbohydrates. **(2)**

.....

.....

(Total for Question 10 is 4 marks)

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11 Explain why a performer's carbohydrate needs generally increase as their weekly training volume (hours of training per week) increases.

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.....

(Total for Question 11 is 2 marks)

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12 Explain why the rugby prop's diet is likely to need a relatively higher protein intake than a distance runner focused primarily on aerobic endurance training.

(Total for Question 12 is 3 marks)

13 Compare the timescale over which the body can access energy from carbohydrate stores versus fat stores during exercise, and explain why this matters for a performer choosing a pre-event fuelling strategy.

(Total for Question 13 is 3 marks)

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Mark scheme · 5.3 Health, Fitness and Wellbeing: Macronutrients - Carbohydrate, Fat and Protein: 30-minute Pack

Question 1

C **B1**

Answer: C

Question 2

B **B1**

Answer: B

Question 3

C **B1**

Answer: C

Question 4

B **B1**

Answer: B

Question 5

Level 3 A detailed and coherent response that accurately explains the roles of carbohydrate, fat and protein, applies them specifically to Ben's several-hour sportive, and reaches a well-justified evaluative judgement about why a balance of all three, rather than any single macronutrient, best supports his training. Sustained, accurate use of nutrition terminology throughout. **7-9**

Level 2 Some accurate coverage of the roles of at least two macronutrients, with some application to Ben's situation, though coverage of all three or the evaluative judgement may be underdeveloped. Generally correct use of terminology. **4-6**

Level 1 Basic or generic statements about carbohydrate, fat and/or protein with little or no specific application to Ben's situation and little evaluation of the need for balance. **1-3**

Level 0 No relevant content. **0**

Indicative content:

- Carbohydrate: the preferred fuel, particularly during the higher-intensity climbs or surges within the sportive, and stored as glycogen that is used up progressively over several hours.
- Fat: a much larger energy reserve than carbohydrate, particularly important for fuelling the many hours of lower-intensity, steady riding within the event.
- Protein: does not fuel the ride directly in significant amounts, but supports repair of muscle tissue damaged during the long ride, aiding recovery and adaptation between training sessions.
- Evaluative point: relying only on carbohydrate risks running out of readily available fuel later in a several-hour event, since glycogen stores are comparatively limited.
- Evaluative point: relying only on fat would not provide fuel quickly enough for higher-intensity efforts within the ride, such as climbs.
- Evaluative point: neglecting protein would slow muscle repair between long training rides, potentially limiting how well Ben adapts to and recovers from his training programme.
- Balanced conclusion: because the sportive combines a long duration with variable intensity, and training needs ongoing recovery, a balance matched to these specific demands supports both performance on the day and progress in training, better than emphasising a single macronutrient.

Question 6

wholegrain bread or pasta, oe **B1**

rice, potatoes or oats, oe **B1**

Answer: Wholegrain bread or pasta, and rice, potatoes or oats, are all good sources of complex carbohydrate.

Question 7

A **B1**

Answer: A

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Question 8

(a) the body's preferred energy source for exercise, oe **B1**

(a) Answer: The body's preferred energy source for exercise.

(b) a secondary/reserve energy source, particularly important for prolonged, lower-intensity exercise, oe **B1**

(b) Answer: A secondary energy source, particularly important for prolonged, lower-intensity exercise.

(c) growth and repair of muscle and other body tissue, oe **B1**

(c) Answer: Growth and repair of muscle and other body tissue.

Question 9

growth of new muscle tissue, oe **B1**

repair of tissue damaged during exercise, oe **B1**

Answer: Protein supports the growth of new muscle tissue, and the repair of tissue damaged during exercise.

Question 10

(a) simple carbohydrates (sugars, e.g. found in fruit or table sugar) are broken down quickly, oe **B1**

(a) complex carbohydrates (starches, e.g. found in pasta, rice or potatoes) are broken down more slowly, oe **B1**

(a) Answer: Simple carbohydrates (sugars, e.g. found in fruit or table sugar) are broken down quickly; complex carbohydrates (starches, e.g. found in pasta, rice or potatoes) are broken down more slowly.

(b) complex carbohydrates release glucose into the bloodstream more gradually, oe **B1**

(b) this provides a steadier, more sustained energy supply rather than a rapid rise and fall, oe **B1**

(b) Answer: Complex carbohydrates release glucose into the bloodstream more gradually than simple carbohydrates, providing a steadier, more sustained energy supply rather than a rapid rise and fall.

Question 11

carbohydrate is stored in the muscles and liver as glycogen and used as the main fuel during exercise, oe **B1**

more training means more glycogen is used up overall, so more carbohydrate is generally needed to restore and fuel that training, oe **B1**

Answer: Carbohydrate is stored in the muscles and liver as glycogen and used as the main fuel during exercise. More training means more glycogen is used up overall, so more carbohydrate is generally needed to restore and fuel that training.

Question 12

the prop's training is likely to involve more resistance/strength-based work aimed at increasing muscle size and strength, oe **B1**

protein is needed for the growth and repair of muscle tissue, oe **B1**

so a higher relative demand for muscle-building and repair is generally matched with a higher relative protein need, oe **B1**

Answer: The prop's training is likely to involve more resistance-based work aimed at increasing muscle size and strength, and protein is needed for the growth and repair of muscle tissue, so this higher muscle-building demand is generally matched with a higher relative protein need.

Question 13

carbohydrate (glycogen) stores are comparatively limited but can be broken down quickly, providing readily available energy, especially for high-intensity efforts, oe **B1**

fat stores are much larger but are broken down more slowly, providing a steadier supply over longer, lower-intensity efforts, oe **B1**

so a performer preparing for a short, intense event may prioritise topping up carbohydrate stores, while a performer preparing for a longer, steadier event can also rely more on fat stores, oe **B1**

Answer: Carbohydrate stores are comparatively limited but broken down quickly, providing readily available energy, especially for high-intensity efforts. Fat stores are much larger but broken down more slowly, providing a steadier supply over longer, lower-intensity efforts. A performer preparing for a short, intense event may therefore prioritise topping up carbohydrate stores, while one preparing for a longer, steadier event can also rely more on fat stores.

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