



PE.PT1 Components of Fitness: Health-Related Components and Fitness Testing

AQA 8582 · Calculator allowed · about 50 minutes

Total Marks

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Name: _____ Date: ____ / ____ / ____

Answer ALL questions. Show all your working.

- 1** Which fitness test is most likely to be used to measure a performer's aerobic (cardiovascular) endurance?

- ☐ A) Grip dynamometer test
- ☐ B) Multi-stage fitness test
- ☐ C) Sit-and-reach test
- ☐ D) Illinois agility test

(Total for Question 1 is 1 mark)

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- 2** State what is meant by each of the following health-related components of fitness.

- (a) Cardiovascular endurance. (1)
- (b) Muscular strength. (1)
- (c) Muscular endurance. (1)
- (d) Flexibility. (1)

(Total for Question 2 is 4 marks)

3 Body composition is one of the five health-related components of fitness.

(a) State what is meant by 'body composition'. (1)

(b) Name one method that can be used to estimate a performer's body composition. (1)

(Total for Question 3 is 2 marks)

4 Name the fitness test used to measure flexibility.

(Total for Question 4 is 1 mark)

5 Describe how the sit-and-reach test is carried out.

(Total for Question 5 is 3 marks)

6 Name the fitness test used to measure muscular strength.

(Total for Question 6 is 1 mark)

7 A grip dynamometer test measures the maximum force of a single squeeze of the hand.

(a) Explain why a grip dynamometer test result mainly tells a coach about a performer's hand and forearm strength, rather than their whole-body strength. (1)

(b) Suggest one sport for which a grip dynamometer test result would be particularly useful to a coach, and justify your answer. (2)

(Total for Question 7 is 3 marks)

8 Name the fitness test used to measure muscular endurance.

(Total for Question 8 is 1 mark)

9 Explain the difference between muscular strength and muscular endurance, referring to how each is tested.

(Total for Question 9 is 2 marks)

10 Name the fitness test used to measure aerobic (cardiovascular) endurance.

(Total for Question 10 is 1 mark)

11 Describe how the multi-stage fitness test is carried out and what it estimates.

(Total for Question 11 is 3 marks)

- 12** Table 1 shows fitness test results for three athletes, alongside a simplified classroom rating table.

Table 1: Results

Athlete	Bleep test level	Sit-and-reach (cm)	Grip dynamometer (kg)
Amara	10.2	28	34
Ben	7.5	18	45
Chen	12.8	22	29

Table 2: Simplified classroom rating bands

Rating	Bleep test level	Sit-and-reach (cm)	Grip dynamometer (kg)
Excellent	11.0 or above	27 or above	40 or above
Good	8.0 to 10.9	17 to 26	30 to 39
Average	5.0 to 7.9	7 to 16	20 to 29
Below average	below 5.0	below 7	below 20

- (a) Using Table 2, state Amara's rating for the sit-and-reach test. (1)
- (b) Using Table 2, state Chen's rating for the bleep test. (1)
- (c) Identify which athlete has the best rating for muscular strength (grip dynamometer), and state their rating. (2)
- (d) Chen has the best rating of the three athletes for aerobic endurance. Using the ratings in the tables, suggest one component of fitness Chen might prioritise developing further, and justify your answer using the data. (3)

(Total for Question 12 is 7 marks)

13 A football coach wants to test the aerobic endurance of the squad before pre-season training begins, since matches involve 90 minutes of repeated intermittent running.

- (a) State which fitness test would be most appropriate, and explain why it suits football's demands. (2)

(Total for Question 13 is 2 marks)

14 Different sports place different demands on a performer's body composition. Explain, without referring to a specific person's body weight, why a gymnast and a rugby forward might benefit from different body compositions for their own sport.

(Total for Question 14 is 3 marks)

15 Which of these fitness tests estimates a performer's body composition by measuring skinfold thickness at set sites on the body?

- ☐ A) Sit-and-reach test
- ☐ B) Skinfold callipers
- ☐ C) Grip dynamometer test
- ☐ D) Multi-stage fitness test

(Total for Question 15 is 1 mark)

16 State two limitations of using BMI (body mass index) to estimate a performer's body composition.

(Total for Question 16 is 2 marks)

17 State which health-related component of fitness is most important for each named athlete, and justify your answer using the demands of their event.

(a) A competitive weightlifter performing a maximal single lift. (2)

(b) A marathon runner. (2)

(Total for Question 17 is 4 marks)

18 Which health-related component of fitness determines how far a joint (or joints) can move through its range of motion?

(Total for Question 18 is 1 mark)

19 Explain one reason why good flexibility can reduce a performer's risk of injury during dynamic sporting movements.

(Total for Question 19 is 2 marks)

20 A basketball coach wants to test the muscular endurance of the team's players before pre-season training.

(a) State which fitness test the coach should use. (1)

(b) Describe how the test is carried out. (2)

(Total for Question 20 is 3 marks)

- 21** Explain why cardiovascular endurance is unlikely to be the health-related component of fitness that a 100 metre sprinter should prioritise developing, even though a good level of aerobic fitness is expected of most athletes.

(Total for Question 21 is 3 marks)

Mark scheme · PE.PT1 Components of Fitness: Health-Related Components and Fitness Testing

Question 1

- **B1** B (multi-stage fitness test)
- **Answer: B (multi-stage fitness test)**

Question 2

- (a) **B1** the ability of the heart and lungs to supply oxygen to the working muscles during sustained exercise, oe
- (a) **Answer: The ability of the heart and lungs to supply oxygen to the working muscles during sustained exercise.**
- (b) **B1** the maximum force a muscle (or muscle group) can exert in a single maximal contraction, oe
- (b) **Answer: The maximum force a muscle can exert in a single maximal contraction.**
- (c) **B1** the ability of a muscle (or muscle group) to keep contracting repeatedly, without tiring, over a period of time, oe
- (c) **Answer: The ability of a muscle to keep repeatedly contracting without tiring over a period of time.**
- (d) **B1** the range of movement possible at a joint (or joints), oe
- (d) **Answer: The range of movement possible at a joint.**

Question 3

- (a) **B1** the relative percentage of body weight made up of fat, muscle and bone, oe
- (a) **Answer: The relative percentage of a person's body weight that is made up of fat, muscle and bone.**
- (b) **B1** skinfold callipers (measuring skinfold thickness at set sites) or BMI (body mass index) calculation, oe
- (b) **Answer: Skinfold callipers, which measure the thickness of skinfolds at set sites on the body.**

Question 4

- **B1** sit-and-reach test
- **Answer: The sit-and-reach test.**

Question 5

- **B1** performer sits with legs straight, feet flat against the sit-and-reach box, oe
- **B1** performer reaches forward slowly along the measuring scale as far as possible, without bending the knees, oe
- **B1** the furthest point reached (held for a moment) is recorded as the score, oe
- **Answer: The performer sits with legs straight and feet flat against the sit-and-reach box, then reaches forward slowly along the scale as far as possible without bending their knees; the furthest point reached is recorded as the score.**

Question 6

- **B1** grip dynamometer test (or a one-repetition maximum test)
- **Answer: The grip dynamometer test.**

Question 7

- (a) **B1** the test only isolates and loads the muscles of the hand/forearm during the squeeze, so it does not test the strength of other muscle groups such as the legs or back, oe
- (a) **Answer: The test only isolates and loads the hand and forearm muscles during the squeeze, so it gives no information about the strength of other muscle groups such as the legs or back.**
- (b) **B1** a sport where grip strength is a key performance factor, e.g. rock climbing or judo, oe
- (b) **B1** because success in that sport depends heavily on being able to grip a hold, an opponent's clothing, or equipment with maximum force, oe
- (b) **Answer: Rock climbing, because a climber's ability to grip and hold onto small handholds under their own bodyweight is a key factor in their performance.**

Question 8

- **B1** one-minute sit-up test (or one-minute press-up test / sit-up bleep test)
- **Answer: The one-minute sit-up test.**

Question 9

- **B1** muscular strength is the maximum force in a single contraction, tested by a single maximal effort such as a grip dynamometer squeeze, oe
- **B1** muscular endurance is the ability to keep contracting repeatedly without tiring, tested by counting repetitions over time, such as a one-minute sit-up test, oe
- **Answer: Muscular strength is the maximum force a muscle can produce in a single contraction, tested by a single maximal effort (e.g. a grip dynamometer squeeze); muscular endurance is the ability to keep contracting repeatedly without tiring, tested by counting repetitions over a set time (e.g. a one-minute sit-up test).**

Question 10

- **B1** multi-stage fitness test (bleep test)
- **Answer: The multi-stage fitness test (bleep test).**

Question 11

- **B1** performers run continuously between two lines 20 metres apart, in time with a series of bleeps, oe
- **B1** the bleeps get progressively closer together, so the required running pace increases at set intervals (levels), oe
- **B1** the test ends when a performer can no longer keep up with the pace; the level/shuttle reached is recorded and used to estimate aerobic endurance, oe
- **Answer: Performers run continuously between two lines 20 metres apart, in time with a series of bleeps that get progressively closer together, increasing the required pace. The test ends when a performer can no longer keep up; the level and shuttle reached is recorded to estimate their aerobic endurance.**

Question 12

- (a) **B1** Excellent (28 cm is 27 cm or above)
- (a) **Answer: Excellent.**
- (b) **B1** Excellent (12.8 is 11.0 or above)
- (b) **Answer: Excellent.**
- (c) **B1** Ben
- (c) **B1** Excellent (45 kg is 40 kg or above)
- (c) **Answer: Ben, whose grip dynamometer score of 45 kg is rated Excellent.**
- (d) **B1** muscular strength, oe
- (d) **B1** Chen's grip dynamometer score (29 kg) is rated only Average, oe
- (d) **B1** this is Chen's lowest rating of the three components shown (Excellent aerobic endurance, Good flexibility, Average strength), so it is the area with the most room for improvement relative to Chen's own profile, oe
- (d) **Answer: Muscular strength, because Chen's grip dynamometer score of 29 kg is rated only Average, which is Chen's lowest of the three ratings shown (Excellent for the bleep test, Good for sit-and-reach), so it represents the biggest gap in Chen's own fitness profile.**

Question 13

- (a) **B1** the multi-stage fitness test, oe
- (a) **B1** it involves continuous running over an extended period at an increasing pace, which reflects the sustained aerobic demand of a 90-minute match, oe
- (a) **Answer: The multi-stage fitness test, because it involves continuous running over an extended period, reflecting the sustained aerobic demand a footballer faces across a 90-minute match.**

Question 14

- **B1** a gymnast typically benefits from a lower body fat percentage relative to muscle mass, improving their power-to-weight ratio for moves such as jumps, rotations and holds, oe
- **B1** a rugby forward (e.g. in the scrum) typically benefits from a higher overall body mass and muscle mass, adding to the force they can generate and their stability against opposing forwards, oe
- **B1** so the 'ideal' body composition depends on the specific physical demands of the sport/role, rather than there being one body composition that suits every sport equally, oe
- **Answer: A gymnast typically benefits from a lower body fat percentage relative to muscle, which improves their power-to-weight ratio for jumps and rotations, while a rugby forward typically benefits from greater overall body and muscle mass, which adds force and stability in the scrum; the two sports place different physical demands on the body, so the body composition that benefits performance differs between them.**

Question 15

- **B1** B (skinfold callipers)
- **Answer: B (skinfold callipers)**

Question 16

- **B1** BMI does not distinguish between muscle mass and fat mass, so a very muscular athlete can be wrongly classed as overweight, oe
- **B1** BMI does not show where fat is distributed around the body, oe
- **Answer: BMI does not distinguish between muscle mass and fat mass, so a highly muscular athlete can be wrongly classed as overweight; and BMI does not show how fat is distributed around the body.**

Question 17

- (a) **B1** muscular strength, oe
- (a) **B1** because the lift is a single maximal effort, requiring the greatest possible force in one contraction rather than repeated or sustained effort, oe
- (a) **Answer: Muscular strength, because a competitive lift is one single maximal effort requiring the greatest possible force in one contraction, which is the definition of muscular strength.**
- (b) **B1** cardiovascular (aerobic) endurance, oe
- (b) **B1** because a marathon requires the heart and lungs to keep supplying oxygen to the working muscles continuously over a very long duration, oe
- (b) **Answer: Cardiovascular (aerobic) endurance, because a marathon requires the heart and lungs to keep supplying oxygen to the leg muscles continuously over a very long duration (over 2 hours for elite runners).**

Question 18

- **B1** flexibility
- **Answer: Flexibility.**

Question 19

- **B1** greater flexibility gives a joint a larger safe range of motion, oe
- **B1** so a fast or forceful movement in sport is less likely to force the joint or surrounding muscles beyond their normal range, which is what causes many strains and sprains, oe
- **Answer: Greater flexibility gives a joint a larger safe range of motion, so a fast or forceful sporting movement is less likely to force the joint or surrounding muscles beyond their normal range, which is a common cause of strains and sprains.**

Question 20

- (a) **B1** one-minute sit-up test (or press-up test), oe
- (a) **Answer: The one-minute sit-up test.**
- (b) **B1** the player performs as many correct sit-ups (or press-ups) as possible in a fixed time (typically one minute), oe
- (b) **B1** the number of correctly completed repetitions in that time is recorded as the score, oe
- (b) **Answer: The player performs as many correctly completed sit-ups as possible in a fixed time of one minute; the number of correct repetitions completed is recorded as the score.**

Question 21

- **B1** a 100m race lasts only around 10 seconds and is powered mainly by the anaerobic energy systems, which do not require a continuous, sustained oxygen supply in the way cardiovascular endurance describes, oe
- **B1** the components that most directly determine 100m performance are speed and power, not the ability to sustain aerobic effort over a long duration, oe
- **B1** so training time is better prioritised on speed/power-based methods rather than heavily prioritising cardiovascular endurance, which would not be specific to the event's actual demands, oe
- **Answer: A 100m race lasts only around 10 seconds and is powered mainly by anaerobic energy systems, so it does not demand a sustained oxygen supply in the way cardiovascular endurance describes; the components that most directly determine performance are speed and power, so a sprinter's training time is better prioritised there rather than on cardiovascular endurance, which would not be specific to the event's real demands.**