3.1 Components of Fitness: Endurance, Strength, Flexibility and Fitness Testing: 30-minute Pack

AQA 8582 · Calculator allowed · about 30 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Different sports place different demands on a performer's components of fitness. Explain why a gymnast and a rugby forward might prioritise different components of fitness for their own sport.

(Total for Question 1 is 3 marks)

2 Which of these fitness tests is used to measure a performer's maximal strength?

- ☐ A) Sit-and-reach test
- ☐ B) One rep max test
- ☐ C) Sit-up bleep test
- ☐ D) Multi-stage fitness test

(Total for Question 2 is 1 mark)

3 State which 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 3 is 4 marks)

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4 Explain why cardiovascular endurance is unlikely to be the 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 4 is 3 marks)

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5 Strength can be maximal, static, dynamic or explosive.

(a) State what is meant by 'static strength'. **(1)**

(b) Give one sporting example of static strength. **(1)**

(Total for Question 5 is 2 marks)

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6 Name the fitness test used to measure flexibility.

(Total for Question 6 is 1 mark)

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7 Name the fitness test used to measure strength.

(Total for Question 7 is 1 mark)

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8 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 8 is 3 marks)

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9 Name the fitness test used to measure muscular endurance.

(Total for Question 9 is 1 mark)

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

(Total for Question 10 is 3 marks)

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

(Total for Question 11 is 3 marks)

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12 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 12 is 3 marks)

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

(Total for Question 13 is 2 marks)

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

(Total for Question 14 is 2 marks)

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15 State two limitations of using fitness test results to judge a performer's fitness for their sport.

(Total for Question 15 is 2 marks)

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Mark scheme · 3.1 Components of Fitness: Endurance, Strength, Flexibility and Fitness Testing: 30-minute Pack

Question 1

a gymnast typically needs high flexibility, a large range of movement at joints such as the hips and shoulders for splits, straddles and bridges, oe **B1**

a rugby forward (e.g. in the scrum) typically needs high strength, the ability to overcome the resistance of the opposing pack and hold or drive the scrum, oe **B1**

so which components of fitness are needed depends on the specific physical demands of the sport/role, rather than every sport needing the same components equally, oe **B1**

Answer: A gymnast typically needs high flexibility, a large range of movement at the hips and shoulders for splits, straddles and bridges, while a rugby forward typically needs high strength to overcome the resistance of the opposing pack in the scrum; the two sports place different physical demands on the body, so the components of fitness each performer prioritises differ.

Question 2

B (one rep max test) **B1**

Answer: B (one rep max test)

Question 3

(a) strength (maximal strength), oe **B1**

(a) because the lift is a single maximal effort, requiring the greatest possible force in one contraction rather than repeated or sustained effort, oe **B1**

(a) Answer: Maximal strength, because a competitive lift is one single maximal effort requiring the greatest possible force in one contraction to overcome the resistance of the bar.

(b) cardiovascular (aerobic) endurance, oe **B1**

(b) because a marathon requires the heart and lungs to keep supplying oxygen to the working muscles continuously over a very long duration, oe **B1**

(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 4

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 **B1**

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.

Question 5

(a) the ability to hold a body part (limb) in a static position, with the muscle length staying the same / the maximum force that can be applied to an immovable object, oe **B1**

(a) Answer: The ability to hold a body part in a static position, where the muscle length stays the same.

(b) any valid example of holding a position against a resistance, eg a gymnast holding a crucifix on the rings, a rugby forward holding the scrum steady, a tug of war team holding the rope, oe **B1**

(b) Answer: A gymnast holding a crucifix position on the rings.

Question 6

sit-and-reach test **B1**

Answer: The sit-and-reach test.

Question 7

handgrip dynamometer test (or one rep max test for maximal strength) **B1**

Answer: The handgrip dynamometer test.

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Question 8

(a) 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 **B1**

(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) a sport where grip strength is a key performance factor, e.g. rock climbing or judo, oe **B1**

(b) because success in that sport depends heavily on being able to grip a hold, an opponent's clothing, or equipment with maximum force, oe **B1**

(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 9

sit-up bleep test (or a one-minute sit-up / press-up test) **B1**

Answer: The sit-up bleep test.

Question 10

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 **B1**

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 11

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 **B1**

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 12

(a) sit-up bleep test (or a one-minute sit-up / press-up test), oe **B1**

(a) Answer: The sit-up bleep test.

(b) the player performs sit-ups in time with a recorded series of bleeps, which get faster as the test goes on, oe **B1**

(b) the test ends when the player can no longer keep pace with the bleeps (or loses correct technique); the number of correct sit-ups completed is recorded as the score, oe **B1**

(b) Answer: The player performs sit-ups in time with a recorded series of bleeps that get faster as the test goes on; when they can no longer keep pace (or lose correct technique) the test ends, and the number of correct sit-ups completed is recorded as the score.

Question 13

strength is the ability to overcome a resistance, eg the maximum force in a single contraction, tested by a single maximal effort such as a handgrip dynamometer squeeze, oe **B1**

muscular endurance is the ability to undergo repeated contractions avoiding fatigue, tested by counting repetitions, such as the sit-up bleep test, oe **B1**

Answer: Strength is the ability to overcome a resistance, tested by a single maximal effort (e.g. a handgrip dynamometer squeeze); muscular endurance is the ability to keep contracting repeatedly while avoiding fatigue, tested by counting repetitions (e.g. the sit-up bleep test).

Question 14

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 **B1**

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 15

tests are often not sport specific / too general, or do not replicate the movements of the activity, oe **B1**

tests do not replicate competitive conditions; or many are sub-maximal / not directly measured, so inaccurate; or some need motivation / have questionable reliability; or they must follow correct procedures to be valid, oe **B1**

Answer: Fitness tests are often too general and do not replicate the movements of the performer's sport; and they do not replicate the competitive conditions of a real match or event.

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