



PE.PT4 Training Methods and Their Suitability

AQA 8582 · Calculator allowed · about 50 minutes

Total Marks

Name: _____ Date: ____ / ____ / ____

Answer ALL questions. Show all your working.

- 1** Which training method would most effectively improve a marathon runner's aerobic (cardiovascular) endurance?

- ☐ A) Plyometric training
- ☐ B) Continuous training
- ☐ C) Weight training with heavy loads and few repetitions
- ☐ D) Static stretching

(Total for Question 1 is 1 mark)

2 State the training method described by each definition below.

- (a)** Continuous, steady-pace exercise performed for an extended period with no rest intervals. **(1)**
- (b)** Continuous exercise in which the pace and/or terrain is varied throughout the session (sometimes called 'speed play'). **(1)**
- (c)** Repeated periods of work separated by set periods of rest or lower-intensity recovery. **(1)**
- (d)** A series of exercise stations, each targeting a different muscle group or fitness component, completed in sequence. **(1)**
- (e)** Lifting weights against a resistance, with the load and number of repetitions varied depending on the goal. **(1)**
- (f)** Explosive exercises such as bounding, hopping and jumping that use a rapid stretch of a muscle immediately followed by a rapid, powerful contraction. **(1)**

(Total for Question 2 is 6 marks)

3 Explain why interval training using SHORT, near-maximal effort work periods with LONG recovery periods is more likely to improve an athlete's speed than their aerobic endurance.

(Total for Question 3 is 2 marks)

- 4 Explain why interval training using LONGER work periods at a lower (but still testing) intensity, with SHORTER recovery periods, is more likely to improve aerobic endurance than pure speed.

(Total for Question 4 is 2 marks)

- 5 Name the training method that involves continuous exercise in which the pace and/or terrain is varied throughout the session.

(Total for Question 5 is 1 mark)

- 6 Explain why fartlek training can improve both aerobic endurance and some anaerobic fitness/speed within the same session.

(Total for Question 6 is 2 marks)

- 7 Name the training method that uses a series of exercise stations, each targeting a different muscle group or fitness component, completed for a set time or number of repetitions before moving to the next.

(Total for Question 7 is 1 mark)

- 8 Explain why circuit training can be adapted to improve different components of fitness, depending on how the stations, work time and rest time are designed.

(Total for Question 8 is 3 marks)

- 9** Name the training method that, when using a HIGH load and LOW number of repetitions, is most effective for improving maximal muscular strength.

(Total for Question 9 is 1 mark)

- 10** Training loads in weight training are often set as a percentage of an athlete's one-repetition maximum (1RM): the maximum weight they can lift correctly for a single repetition. Training weight is calculated as: training weight = 1RM x target percentage.

(a) State what is meant by an athlete's one-repetition maximum (1RM). (1)

(b) An athlete has a 1RM back squat of 90 kg. Using the formula given, calculate 70 per cent of this athlete's 1RM. (2)

(c) State whether a training programme using a HIGH percentage of 1RM (e.g. 85 to 100 per cent) with LOW repetitions is more likely to develop maximal strength or muscular endurance, and justify your answer. (2)

(Total for Question 10 is 5 marks)

- 11** State whether a LOW percentage of 1RM (e.g. 40 to 60 per cent) combined with a HIGH number of repetitions is more likely to develop maximal strength or muscular endurance.

(Total for Question 11 is 1 mark)

- 12** Name the training method made up of explosive exercises such as bounding, hopping and jumping, most effective for improving power.

(Total for Question 12 is 1 mark)

- 13** Explain why plyometric training is effective for improving an athlete's power, referring to how the exercises work the muscles.

(Total for Question 13 is 3 marks)

- 14** Name the training method that involves holding a stretch at the furthest comfortable point of a joint's range of motion for a period of time, most effective for improving flexibility.

(Total for Question 14 is 1 mark)

- 15** A shot putter wants to improve their explosive power for the throw and their maximal strength for the initial push, before their competition season.

- (a) State one training method suitable for improving the shot putter's power. (1)
- (b) State one training method suitable for improving the shot putter's maximal strength. (1)
- (c) Explain why continuous training would be an unsuitable PRIMARY training method for this shot putter. (3)

(Total for Question 15 is 5 marks)

- 16** State one reason why circuit training might be a MORE suitable choice than continuous training for a team-sport pre-season programme that needs to develop several different components of fitness at once.

(Total for Question 16 is 2 marks)

17 Compare interval training with continuous training as methods of improving aerobic endurance.

(a) State one advantage of interval training compared with continuous training. **(1)**

(b) State one disadvantage of interval training compared with continuous training. **(1)**

(Total for Question 17 is 2 marks)

18 Explain why it would be inappropriate to base a novice, previously untrained beginner's programme mainly around plyometric training, referring to injury risk.

(Total for Question 18 is 3 marks)

19 State one reason why flexibility training (e.g. static stretching) is often included as part of a warm-up or cool-down, rather than being used as a stand-alone main training method.

(Total for Question 19 is 2 marks)

20 Marcus is a rugby prop forward. His role requires high maximal strength for scrummaging, explosive power for tackling and driving forward, and enough muscular endurance to keep producing this output for a full 80-minute match.

Evaluate which training methods would be most suitable for Marcus's training programme, and discuss the suitability of continuous training as a method for a player in his position.

(Total for Question 20 is 9 marks)

Mark scheme · PE.PT4 Training Methods and Their Suitability

Question 1

- **B1** B (continuous training)
- **Answer: B (continuous training)**

Question 2

- (a) **B1** continuous training
- (a) **Answer: Continuous training.**
- (b) **B1** fartlek training
- (b) **Answer: Fartlek training.**
- (c) **B1** interval training
- (c) **Answer: Interval training.**
- (d) **B1** circuit training
- (d) **Answer: Circuit training.**
- (e) **B1** weight (resistance) training
- (e) **Answer: Weight (resistance) training.**
- (f) **B1** plyometric training
- (f) **Answer: Plyometric training.**

Question 3

- **B1** the short, near-maximal work periods overload the muscles' ability to produce force very quickly (the anaerobic/speed systems), not the ability to sustain aerobic effort, oe
- **B1** the long recovery periods allow the athlete to be near fully recovered before each effort, so each rep can be performed at close to maximum speed rather than at a sustainable aerobic pace, oe
- **Answer: The short, near-maximal work periods overload the muscles' ability to produce force very quickly, targeting speed rather than sustained aerobic effort, and the long recovery periods let the athlete be near fully recovered before each rep, so every rep can be performed at close to maximum speed rather than at a sustainable aerobic pace.**

Question 4

- **B1** the longer work periods force the aerobic energy system to keep supplying oxygen to the muscles over a sustained duration, oe
- **B1** the shorter recovery periods mean the athlete does not fully recover between efforts, continuing to stress the cardiovascular system across the whole session, similar to a sustained aerobic effort, oe
- **Answer: The longer work periods force the aerobic energy system to keep supplying oxygen to the muscles over a sustained duration, and the shorter recovery periods mean the athlete does not fully recover between efforts, keeping the cardiovascular system under continued stress across the whole session, similar to a sustained aerobic effort.**

Question 5

- **B1** fartlek training
- **Answer: Fartlek training.**

Question 6

- **B1** the session is continuous overall, which places a sustained demand on the aerobic system throughout, oe
- **B1** but it also includes faster bursts of pace, which place a short, higher-intensity demand on the anaerobic system and speed, so both systems are trained within one session, oe
- **Answer: The session is continuous overall, which places a sustained demand on the aerobic system throughout, but it also includes faster bursts of pace, which place a short, higher-intensity demand on the anaerobic system and speed, so both systems are trained within the same session.**

Question 7

- **B1** circuit training
- **Answer: Circuit training.**

Question 8

- **B1** different stations can be chosen to target different muscle groups or fitness components (e.g. some stations for muscular endurance, others for strength or power), oe
- **B1** using a high number of repetitions/longer work time with a lighter load mainly develops muscular endurance, while short rest periods between stations can also add a cardiovascular endurance element, oe
- **B1** so the same basic format (a series of timed stations) can be redesigned to prioritise whichever fitness components the coach wants to develop, rather than always producing the same adaptation, oe
- **Answer: Different stations can be chosen to target different muscle groups or components; using a high number of repetitions with a lighter load mainly develops muscular endurance, while keeping rest periods between stations short can also add a cardiovascular endurance element. This means the same basic circuit format can be redesigned to prioritise whichever components the coach wants to develop.**

Question 9

- **B1** weight (resistance) training
- **Answer: Weight (resistance) training.**

Question 10

- (a) **B1** the maximum weight an athlete can lift correctly for a single repetition, oe
- (a) **Answer: The maximum weight an athlete can lift correctly for a single repetition.**
- (b) **M1** 0.7×90 , oe
- (b) **A1** 63 kg
- (b) **Answer: 63 kg.**
- (c) **B1** maximal strength, oe
- (c) **B1** because lifting very close to the maximum weight the muscle can move forces it to produce close to its greatest possible force, which is the adaptation that improves strength rather than the ability to repeat contractions, oe
- (c) **Answer: Maximal strength, because lifting very close to the athlete's 1RM forces the muscle to produce close to its greatest possible force in each repetition, which is the adaptation that develops strength rather than the ability to repeat contractions many times.**

Question 11

- **B1** muscular endurance
- **Answer: Muscular endurance.**

Question 12

- **B1** plyometric training
- **Answer: Plyometric training.**

Question 13

- **B1** plyometric exercises involve a rapid stretch (lengthening) of a muscle immediately followed by a rapid, powerful contraction, known as the stretch-shortening cycle, oe
- **B1** this trains the muscle and nervous system to produce a large force in a very short amount of time, oe
- **B1** which directly matches the definition of power (strength applied quickly), so repeated exposure to this stretch-shortening action improves how much force the muscle can generate explosively, oe
- **Answer: Plyometric exercises involve a rapid stretch of a muscle immediately followed by a rapid, powerful contraction (the stretch-shortening cycle), which trains the muscle and nervous system to produce a large force in a very short amount of time. This directly matches the definition of power as strength applied quickly, so repeated plyometric training improves how explosively the muscle can generate force.**

Question 14

- **B1** static stretching (flexibility training)
- **Answer: Static stretching (flexibility training).**

Question 15

- (a) **B1** plyometric training
- **(a) Answer: Plyometric training.**
- (b) **B1** weight (resistance) training, using a high load and low repetitions
- **(b) Answer: Weight training, using a high load and low repetitions.**
- (c) **B1** continuous training mainly develops aerobic (cardiovascular) endurance, oe
- (c) **B1** a shot put is a single, short, explosive maximal effort lasting only a few seconds, so it does not rely on sustained aerobic energy supply, oe
- (c) **B1** so continuous training would not be specific to the demands of the event, and would not develop the strength or power that actually determine shot put performance, oe
- **(c) Answer: Continuous training mainly develops aerobic endurance, but a shot put is a single, short, explosive effort lasting only a few seconds, so it does not rely on sustained aerobic energy supply. Continuous training would therefore not be specific to the event's demands and would not develop the strength or power that actually determine performance.**

Question 16

- **B1** circuit training can include a variety of different stations, each targeting a different component of fitness, oe
- **B1** whereas continuous training mainly targets one component (aerobic endurance) throughout the whole session, oe
- **Answer: Circuit training can include a variety of different stations, each targeting a different component of fitness within the same session, whereas continuous training mainly targets one component, aerobic endurance, throughout the whole session.**

Question 17

- (a) **B1** the work:rest ratio can be precisely adjusted to target a specific intensity/energy system, giving the coach more control than a single steady continuous pace, oe
- **(a) Answer: The work:rest ratio can be precisely adjusted to target a specific intensity or energy system, giving the coach more control than a single steady continuous pace.**
- (b) **B1** it is more complex to plan, time and monitor correctly (getting the work:rest ratio and intensity right) than a simple continuous run, oe
- **(b) Answer: It is more complex to plan, time and monitor correctly than a simple continuous run.**

Question 18

- **B1** plyometric exercises place high impact/stress forces on the joints, tendons and muscles, oe
- **B1** a beginner with no existing strength/conditioning base has tissues that are not yet prepared to safely absorb these forces, oe
- **B1** so plyometrics should be introduced gradually once a basic strength base has been built, rather than being used as a beginner's main training method, in line with the principle of progressive overload, oe
- **Answer: Plyometric exercises place high impact and stress forces on the joints, tendons and muscles; a beginner with no existing strength or conditioning base has tissues that are not yet prepared to safely absorb these forces, so plyometrics should be introduced gradually once a basic strength base has been built, rather than being used as a beginner's main method, in line with progressive overload.**

Question 19

- **B1** flexibility training's main benefit (increased range of motion at joints) mainly supports the safe/effective performance of other training or activity, oe
- **B1** rather than directly improving a performance component such as strength, power or endurance on its own, so it is usually combined with, rather than replacing, other training methods, oe
- **Answer: Flexibility training's main benefit, an increased range of motion at the joints, mainly supports the safe and effective performance of other training or activity, rather than directly improving a performance component such as strength, power or endurance on its own. It is therefore usually combined with other training methods rather than used as a stand-alone main method.**

Question 20

- **Level 3** (7-9): A detailed and coherent response that identifies training methods suited to Marcus's specific demands (strength, power, muscular endurance), applies the discussion to his position (scrummaging, tackling, an 80-minute match), and reaches a balanced, well-reasoned judgement on the suitability of continuous training. Sustained, accurate use of terminology throughout.
- **Level 2** (4-6): Some accurate identification of suitable training methods and some discussion of continuous training's suitability, with partial application to Marcus's specific role, but coverage may be incomplete or the evaluation may be one-sided.
- **Level 1** (1-3): Basic or generic statements about training methods with little or no application to Marcus's specific role, and little or no discussion of continuous training's suitability.
- **Level 0** (0): No relevant content.
- **Indicative content:**
 - Weight (resistance) training using a high load and low repetitions would develop the maximal strength Marcus needs for scrummaging, where he must produce very large forces against the opposition front row.
 - Plyometric training would develop the explosive power Marcus needs for tackling and driving forward, since these actions require rapid, forceful muscle contractions similar to the stretch-shortening cycle plyometrics trains.
 - Circuit training, or weight training using a moderate load with higher repetitions, could help develop the muscular endurance Marcus needs to keep producing high force output repeatedly across an 80-minute match, rather than only in a single effort.
 - Continuous training is relatively unsuitable as Marcus's PRIMARY method, since it mainly develops aerobic endurance rather than the maximal strength and explosive power that most directly determine his performance in scrums, tackles and drives.
 - However, some low-intensity continuous or aerobic work may still have a minor role, supporting general match fitness, recovery between efforts, and overall conditioning across a long match, so a balanced answer should not dismiss it completely.
 - A well-reasoned evaluation should conclude that Marcus's programme should be dominated by strength, power and muscular-endurance-focused methods, matched specifically to his role, with continuous training used only in a minor, supporting capacity rather than as a main method.