



PE.PT6 Warm-Up and Cool-Down

AQA 8582 · Calculator allowed · about 51 minutes

Total Marks

Name: _____ Date: ____ / ____ / ____

Answer ALL questions. Show all your working.

- 1** Which part of a warm-up is designed mainly to gradually increase heart rate and blood flow to the muscles?

- ☐ A) Pulse raiser
☐ B) Static stretching
☐ C) Skill rehearsal
☐ D) Cool-down

(Total for Question 1 is 1 mark)

- 2** A warm-up is normally made up of three phases. Name each phase and give a brief description of its purpose.

(a) The first phase. (1)

(b) The second phase. (1)

(c) The third phase. (1)

(Total for Question 2 is 3 marks)

- 3** Explain why raising muscle temperature during the pulse-raiser phase of a warm-up can reduce the risk of a muscle strain during the main activity.

(Total for Question 3 is 3 marks)

- 4** Explain why increasing blood flow to the working muscles during a warm-up can improve performance in the activity that follows.

(Total for Question 4 is 2 marks)

- 5** Explain why the mobility/stretching phase of a warm-up, which increases a performer's range of motion at their joints, is useful before taking part in sport.

(Total for Question 5 is 2 marks)

- 6** Explain the purpose of the skill-rehearsal (sport-specific) phase at the end of a warm-up.

(Total for Question 6 is 2 marks)

- 7** State one benefit of a warm-up, other than reducing the risk of injury.

(Total for Question 7 is 1 mark)

- 8** Explain what happens to the body during a cool-down that helps remove waste products such as lactic acid from the muscles more quickly than complete rest would.

(Total for Question 8 is 2 marks)

- 9** Explain why a cool-down helps prevent 'blood pooling' in the legs after intense exercise, and briefly explain why blood pooling can be a problem.

(Total for Question 9 is 2 marks)

- 10** Name the type of stretching most commonly used AFTER exercise, during a cool-down, rather than as dynamic movement before exercise.

(Total for Question 10 is 1 mark)

- 11** Explain one benefit of including static stretching during a cool-down.

(Total for Question 11 is 2 marks)

- 12** Table 1 shows a footballer's heart rate recorded at four points around a training session.

Table 1

Time point	Heart rate (bpm)
Resting (before warm-up)	70
After the pulse raiser	110
Peak, during the main activity	175
5 minutes into the cool-down	120

- (a) Using Table 1, explain the change in heart rate from resting to after the pulse raiser. (2)
- (b) Using Table 1, explain why the heart rate recorded 5 minutes into the cool-down (120 bpm) is higher than the resting value (70 bpm) but lower than the peak value (175 bpm). (3)

(Total for Question 12 is 5 marks)

- 13** A coach skips the cool-down after a hard training session because the team is short on time. Explain one disadvantage of this decision for the players.

(Total for Question 13 is 2 marks)

- 14** Explain why the specific content of a warm-up (e.g. which skills are rehearsed) should be different for a rugby player compared with a swimmer.

(Total for Question 14 is 2 marks)

- 15** Which of these is the correct general order of the three phases of a warm-up?

- ☐ A) Skill rehearsal, pulse raiser, stretching
- ☐ B) Pulse raiser, stretching, skill rehearsal
- ☐ C) Stretching, skill rehearsal, pulse raiser
- ☐ D) Pulse raiser, skill rehearsal, stretching

(Total for Question 15 is 1 mark)

- 16** Explain why a warm-up is normally performed at a gradually increasing intensity, rather than starting at high intensity straight away.

(Total for Question 16 is 2 marks)

- 17** Explain why a cool-down is particularly recommended after a HIGH-intensity training session (such as an anaerobic interval session), but is sometimes considered less essential after a very LOW-intensity session (e.g. a gentle recovery jog).

(Total for Question 17 is 3 marks)

- 18** State two signs that an athlete might not be sufficiently warmed up before starting intense exercise.

(Total for Question 18 is 2 marks)

- 19** A gymnast is about to perform a routine that requires a full range of movement at the shoulders and hips (e.g. splits, high kicks). Explain why the mobility/stretching phase of her warm-up is especially important for this specific routine.

(Total for Question 19 is 3 marks)

- 20** State two physiological changes that occur in the body during an effective warm-up, and two that occur during an effective cool-down.

(a) Two changes during an effective warm-up. (2)

(b) Two changes during an effective cool-down. (2)

(Total for Question 20 is 4 marks)

- 21** James is about to play in a 5-a-side football match on a cold evening.
Discuss why an effective warm-up is particularly important for James in these conditions, and evaluate what his warm-up should include.

(Total for Question 21 is 6 marks)

Mark scheme · PE.PT6 Warm-Up and Cool-Down

Question 1

- **B1** A (pulse raiser)
- **Answer: A (pulse raiser)**

Question 2

- (a) **B1** pulse raiser; purpose = gradually raise heart rate and blood flow through light continuous activity, oe
- (a) **Answer: The pulse raiser; its purpose is to gradually raise heart rate and blood flow through light continuous activity.**
- (b) **B1** mobility/stretching; purpose = increase range of motion at the joints and further prepare the muscles, oe
- (b) **Answer: Mobility/stretching; its purpose is to increase range of motion at the joints and further prepare the muscles.**
- (c) **B1** skill rehearsal / sport-specific practice; purpose = practise movements/skills relevant to the activity and mentally prepare, oe
- (c) **Answer: Skill rehearsal (sport-specific practice); its purpose is to practise movements or skills relevant to the activity and mentally prepare for it.**

Question 3

- **B1** gentle continuous activity gradually raises the temperature of the working muscles, oe
- **B1** warmer muscles are more elastic (pliable) and can stretch further before tearing than cold muscles, oe
- **B1** so a sudden powerful or fast movement in the main activity is less likely to overstretch and strain the muscle, oe
- **Answer: Gentle continuous activity gradually raises the temperature of the working muscles. Warmer muscles are more elastic and can stretch further before tearing than cold muscles, so a sudden powerful or fast movement in the main activity is less likely to overstretch and strain the muscle.**

Question 4

- **B1** increased blood flow delivers more oxygen (and nutrients) to the working muscles, oe
- **B1** supporting aerobic energy production in the muscles from the very start of the main activity, which can help delay fatigue, oe
- **Answer: Increased blood flow delivers more oxygen and nutrients to the working muscles, supporting aerobic energy production from the very start of the main activity, which can help delay fatigue.**

Question 5

- **B1** mobilising the joints and lengthening the muscles allows a fuller, safer range of movement, oe
- **B1** reducing the risk that a fast or forceful movement during the activity forces a joint or muscle beyond its normal safe range, oe
- **Answer: Mobilising the joints and lengthening the muscles allows a fuller, safer range of movement, reducing the risk that a fast or forceful movement during the activity forces a joint or muscle beyond its normal safe range.**

Question 6

- **B1** it allows the performer to practise movements/skills specific to their activity at increasing intensity, preparing the body for the technical and physical demands of the session or match, oe
- **B1** it also helps the performer mentally focus and prepare for the specific demands of the activity ahead, oe
- **Answer: It allows the performer to practise movements and skills specific to their activity at increasing intensity, preparing the body for the technical and physical demands of the session or match, and it also helps the performer mentally focus and prepare for what lies ahead.**

Question 7

- **B1** improved mental readiness/focus, or improved reaction time/muscle response due to raised body temperature, oe
- **Answer: Improved mental readiness and focus for the activity ahead.**

Question 8

- **B1** continuing to exercise gently keeps blood flowing through the muscles (maintains blood flow/venous return), oe
- **B1** this carries oxygen to the muscles and helps carry waste products such as lactic acid away faster than if the athlete stopped moving suddenly, oe

Question 9

- **B1** continuing to gently move the legs during a cool-down keeps the muscles contracting, which helps pump blood back toward the heart (maintains venous return), oe
- **B1** without this, blood can pool in the veins of the legs due to gravity if the athlete stops suddenly, which can cause dizziness or fainting, oe
- **Answer: Continuing to gently move the legs during a cool-down keeps the muscles contracting, which helps pump blood back toward the heart. Without this, blood can pool in the veins of the legs due to gravity if the athlete stops suddenly, which can cause dizziness or even fainting.**

Question 10

- **B1** static stretching
- **Answer: Static stretching.**

Question 11

- **B1** it may help maintain or improve a performer's flexibility over time, oe
- **B1** and some performers find it helps reduce muscle stiffness/soreness in the period after exercise, oe
- **Answer: It may help maintain or improve a performer's flexibility over time, and some performers find it helps reduce muscle stiffness or soreness in the period after exercise.**

Question 12

- (a) **B1** heart rate rises from 70 bpm to 110 bpm, oe
- (a) **B1** because the gentle, continuous aerobic activity of the pulse raiser increases the muscles' demand for oxygen, so the heart beats faster to supply more oxygenated blood, oe
- (a) **Answer: Heart rate rises from 70 bpm to 110 bpm because the gentle, continuous activity of the pulse raiser increases the muscles' demand for oxygen, so the heart beats faster to supply more oxygenated blood.**
- (b) **B1** 120 bpm sits between the resting value of 70 bpm and the peak value of 175 bpm, oe
- (b) **B1** a cool-down gradually reduces exercise intensity rather than stopping suddenly, so heart rate comes down gradually rather than dropping instantly back to resting, oe
- (b) **B1** the body is also still working to recover and remove waste products from the peak effort, which keeps heart rate raised above resting level during this active recovery period, oe
- (b) **Answer: 120 bpm sits between the resting value (70 bpm) and the peak value (175 bpm) because a cool-down gradually reduces exercise intensity rather than stopping suddenly, so heart rate comes down gradually. The body is also still working to recover and remove waste products from the peak effort, which keeps heart rate raised above resting level during this active recovery period.**

Question 13

- **B1** waste products such as lactic acid will be removed from the muscles more slowly than if an active cool-down had taken place, oe
- **B1** which can increase muscle stiffness/soreness in the following day(s), and increases the risk of dizziness from blood pooling if players stop moving very suddenly, oe
- **Answer: Waste products such as lactic acid will be removed from the muscles more slowly than if an active cool-down had taken place, which can increase muscle stiffness or soreness in the following day(s), and increases the risk of dizziness from blood pooling if players stop moving very suddenly.**

Question 14

- **B1** the two sports have different physical and technical demands, using different muscle groups, joints and movement patterns, oe
- **B1** so the mobility and skill-rehearsal exercises should be specific to each sport's actual movements, following the principle of specificity, oe
- **Answer: The two sports have different physical and technical demands, using different muscle groups, joints and movement patterns, so the mobility and skill-rehearsal exercises in each warm-up should be specific to each sport's actual movements, following the principle of specificity.**

Question 15

- **B1** B (pulse raiser, stretching, skill rehearsal)

Question 16

- **B1** starting gently avoids placing sudden intense stress on muscles, tendons and the heart before they have had time to prepare, oe
- **B1** allowing body systems such as heart rate, breathing rate and muscle temperature to adjust progressively, reducing the risk of injury, oe
- **Answer: Starting gently avoids placing sudden intense stress on muscles, tendons and the heart before they have had time to prepare, allowing body systems such as heart rate, breathing rate and muscle temperature to adjust progressively, which reduces the risk of injury.**

Question 17

- **B1** high-intensity anaerobic work produces more lactic acid/waste products and places more stress on the muscles and cardiovascular system, oe
- **B1** so there is more benefit to actively helping remove waste products and gradually lowering heart rate afterward, oe
- **B1** a low-intensity session has not stressed the body to the same extent, so the same active-recovery benefit from a cool-down is much smaller, oe
- **Answer: High-intensity anaerobic work produces more lactic acid and places more stress on the muscles and cardiovascular system, so there is more benefit to actively helping remove waste products and gradually lower heart rate afterward. A low-intensity session has not stressed the body to the same extent, so the same active-recovery benefit from a cool-down is much smaller.**

Question 18

- **B1** muscles feel stiff or tight, or the athlete's heart/breathing rate is still close to resting, oe
- **B1** a reduced range of movement, or a feeling of sluggishness/reduced power in early movements, oe
- **Answer: Muscles feel stiff or tight, or heart and breathing rate are still close to resting; and a reduced range of movement, or a feeling of sluggishness in early movements.**

Question 19

- **B1** the routine demands an extreme range of motion at the shoulders and hips, beyond what many everyday movements require, oe
- **B1** without adequately mobilising and stretching these specific joints in the warm-up, the muscles and connective tissue may not be prepared to safely reach that range, oe
- **B1** increasing the risk of a strain or other injury during the routine if this phase is rushed or skipped, oe
- **Answer: The routine demands an extreme range of motion at the shoulders and hips, beyond what many everyday movements require. Without adequately mobilising and stretching these specific joints in the warm-up, the muscles and connective tissue may not be prepared to safely reach that range, increasing the risk of a strain or other injury during the routine.**

Question 20

- (a) **B1** increased heart rate and breathing rate, oe
- (a) **B1** increased muscle temperature, blood flow to the muscles, or range of motion at the joints, oe
- (a) **Answer: Increased heart rate and breathing rate; and increased muscle temperature, blood flow to the muscles, or range of motion at the joints (any two).**
- (b) **B1** a gradual decrease in heart rate and breathing rate, oe
- (b) **B1** maintained blood flow/venous return (preventing pooling), or gradual removal of waste products such as lactic acid, oe
- (b) **Answer: A gradual decrease in heart rate and breathing rate; and maintained blood flow/venous return, or gradual removal of waste products such as lactic acid (any two).**

Question 21

- **Level 3** (5-6): A detailed and coherent response that explains why cold conditions raise the importance of an effective warm-up, and evaluates specific, appropriate content for James's warm-up (relevant to both the cold conditions and 5-a-side's demands), reaching a balanced overall view. Sustained, accurate use of terminology.
- **Level 2** (3-4): Some accurate explanation of why cold conditions matter and some relevant suggestions for warm-up content, but coverage of James's specific situation (cold weather, 5-a-side demands) may be incomplete or one-sided.
- **Level 1** (1-2): Basic or generic statements about warm-ups with little or no application to James's specific situation (cold conditions, 5-a-side football).
- **Level 0** (0): No relevant content.
- **Indicative content:**
 - In cold conditions, muscles start at a lower temperature and are stiffer/less elastic than in warm conditions, which can increase the risk of a strain if intense movement begins too suddenly.
 - The pulse-raiser phase is especially important for James to raise his muscle temperature and heart rate before more demanding movement, since starting from a colder baseline than usual.
 - The mobility/stretching phase should ensure a full range of motion is reached despite the cold, since cold muscles and joints may naturally have a reduced range until properly warmed.
 - The skill-rehearsal phase should reflect 5-a-side football's short, sharp, multidirectional movements (quick changes of direction, short sprints, agile footwork in a small space), so relevant skills such as short sprints, turns and ball-striking should be rehearsed.
 - A balanced evaluation could note that James's warm-up may need to be slightly longer or more thorough than on a warm evening, to fully offset the extra time cold muscles take to reach a safe working temperature.
 - Overall, the combination of general physiological preparation (raised temperature, heart rate, range of motion) and 5-a-side-specific skill rehearsal together reduce James's injury risk and prepare him to perform from the first minute of the match.