

Physical Education
Component 1: Fitness and Body Systems

Wednesday 15 May 2019 – Morning

Time: 1 hour 45 minutes,
plus your additional time allowance

You do not need any other materials.

See the Instructions, Information and Advice
on the next page.

Candidate surname					
Other names					
Centre Number					
Candidate Number					

Instructions

- Use **BLACK** ink or ball-point pen.
- **FILL IN THE BOXES** on the front page with your name, centre number and candidate number.
- Answer **ALL** questions.
- Answer the questions in the spaces provided – there may be more space than you need.

Information

- The total mark for this paper is **90**.
- The marks for **EACH** question are shown in brackets – use this as a guide as to how much time to spend on each question.

Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.

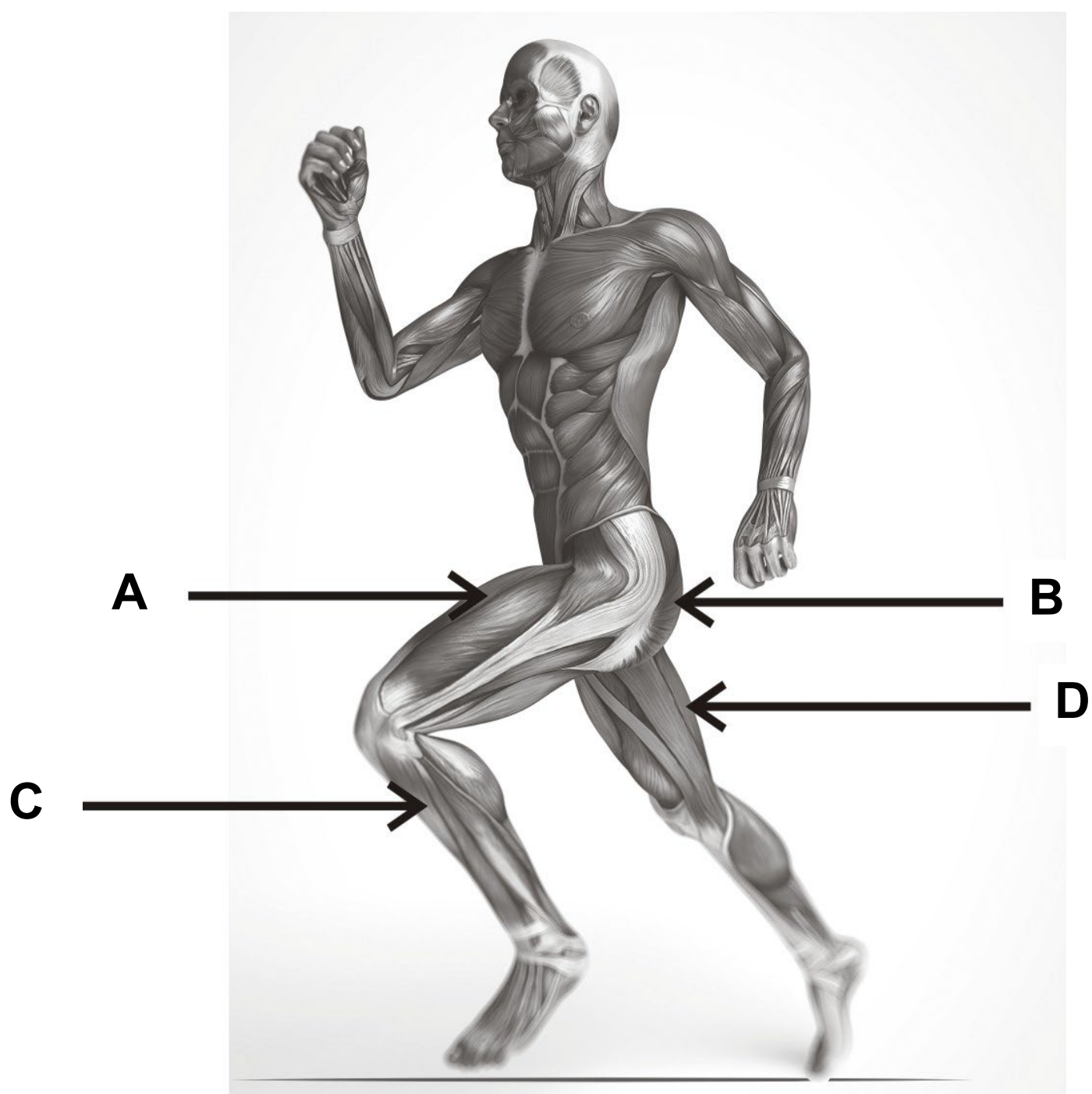
Answer ALL questions.

Write your answers in the spaces provided.

Some questions must be answered with a cross in a box ☐. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☐.

1 FIGURE 1 shows the muscular system while running.

FIGURE 1



(Continues on next page)

(Turn over)

For Questions 1(a), 1(b) and 1(c) use FIGURE 1 to decide whether A, B, C or D is correct.

**(a) Which ONE of the following is the gluteus maximus?
(1 mark)**

☐ **A Muscle A**

☐ **B Muscle B**

☐ **C Muscle C**

☐ **D Muscle D**

(Question continues on next page)

**(b) Which ONE of the following states the role of muscle D?
(1 mark)**

- ☐ **A Extension of the leg at the hip**
- ☐ **B Extension of the leg at the knee**
- ☐ **C Flexion of the leg at the knee**
- ☐ **D Plantar flexion of the ankle**

(Question continues on next page)

(c) Which ONE of the following muscles works antagonistically with muscle D? (1 mark)

☐ **A Muscle A**

☐ **B Muscle B**

☐ **C Muscle C**

☐ **D Muscle D**

(Question continues on next page)

(d) Which ONE of the following blood vessels carries oxygenated blood back to the heart? (1 mark)

- ☐ **A Aorta**
- ☐ **B Pulmonary artery**
- ☐ **C Pulmonary vein**
- ☐ **D Vena cava**

(Question continues on next page)

(e) Which ONE of the following is responsible for clotting the blood? (1 mark)

- ☐ **A Plasma**
- ☐ **B Platelets**
- ☐ **C Red blood cells**
- ☐ **D White blood cells**

(Question continues on next page)

- (f) The data in TABLE 1 shows oxygen levels in the blood before and after gas exchange.

TABLE 1

	Oxygen level BEFORE gas exchange	Oxygen level AFTER gas exchange
A	High	High
B	High	Low
C	Low	High
D	None	Low

Which ONE of the following is the MOST likely level of oxygen in the blood before and after gas exchange at the muscle during exercise? (1 mark)

☐ A High – High

☐ B High – Low

☐ C Low – High

☐ D None – Low

(Question continues on next page)

(Turn over)

**(g) Which ONE of the following is found inside the lungs?
(1 mark)**

- ☐ **A Bronchioles**
- ☐ **B Diaphragm**
- ☐ **C Semi-lunar valves**
- ☐ **D Septum**

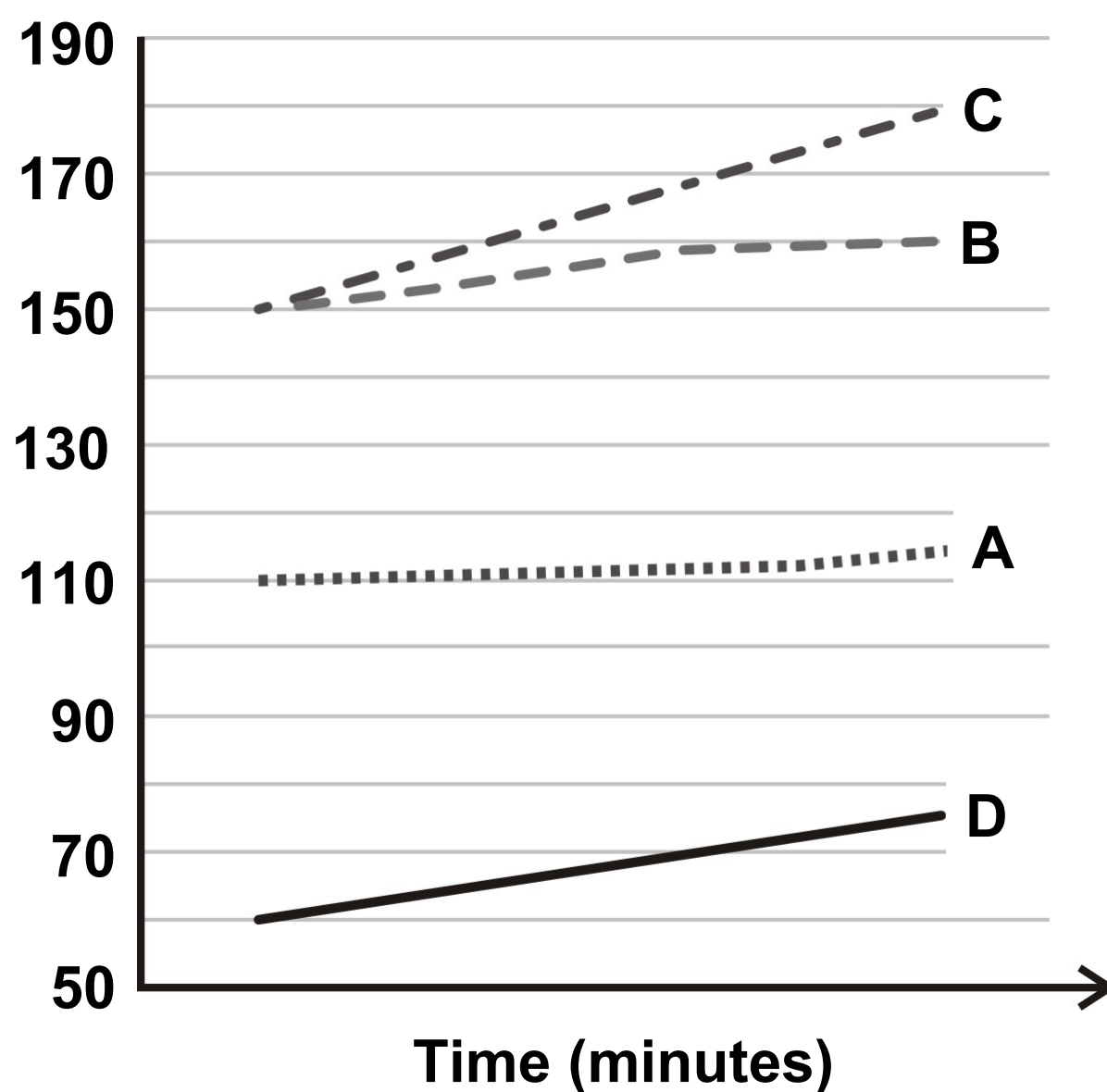
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- (h) Target zones are used to make sure training is at the correct intensity.

FIGURE 2 shows the heart rate values for four 16-year-old students during a training session.

FIGURE 2

Heart rate (bpm)



(Continues on next page)

(Turn over)

Analyse the data in FIGURE 2 to determine which 16-year-old student was working in his aerobic training zone. (1 mark)

☐ **A Student A**

☐ **B Student B**

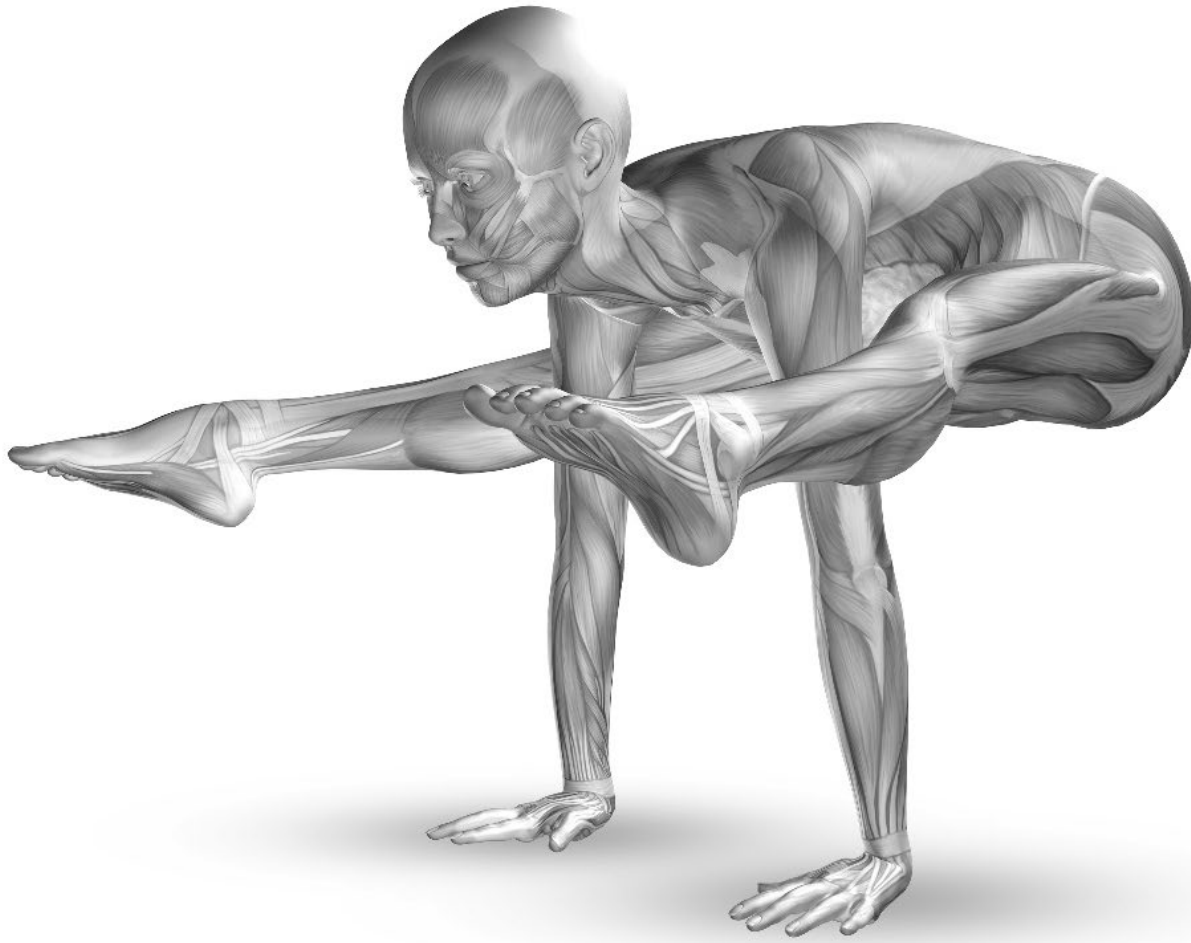
☐ **C Student C**

☐ **D Student D**

(Total for Question 1 = 8 marks)

2 **FIGURE 3 shows the muscular system of a gymnast.**

FIGURE 3



(Continues on next page)

(Turn over)

- (a) Examine the antagonistic muscle action taking place at the elbow in FIGURE 3 that allows the gymnast to achieve this position. (3 marks)

(Question continues on next page)

- (b) The gymnast in FIGURE 3 is supporting her body weight using the bones in the wrist.

Classify the bones of the wrist. (1 mark)

(Question continues on next page)

- (c) Explain, using examples, TWO functions of the skeletal system that help the gymnast move her lower body into this position.

- (i) Function 1 (3 marks)

(Continue answer on next page)

(ii) Function 2 (3 marks)

(Total for Question 2 = 10 marks)

- 3 **FIGURE 4** shows a basketball player jumping to shoot at the basket.

FIGURE 4



(Continues on next page)

(Turn over)

- (a) Explain the MAIN muscle fibre type that is used to jump high when taking the basketball shot. (3 marks)

(Question continues on next page)

- (b) During a game of basketball vascular shunting takes place.**

Describe what happens to blood flow during vascular shunting. (4 marks)

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(Turn over)

(c) Explain ONE reason why vascular shunting is necessary during a game of basketball. (3 marks)

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(Total for Question 3 = 10 marks)

(Turn over)

4 Exercise causes short-term effects on our body systems.

Complete TABLE 2 by:

- (a) Stating ONE short-term effect of exercise on each of the named body systems.**
- (b) Giving a specific example of the importance of this short-term effect on the performer during exercise.**

TABLE 2

	(a) Short-term effect of exercise	(b) Importance to the performer exercising
Cardiovascular system	(1 mark)	(1 mark)
Muscular system	(1 mark)	(1 mark)
Respiratory system	(1 mark)	(1 mark)

(Total for Question 4 = 6 marks)

(Turn over)

- 5 **FIGURE 5** shows a performer during a weight training session.

FIGURE 5



- (a) Identify the class of lever system in use when the performer moves from standing onto her toes in **FIGURE 5**. (1 mark)

(Question continues on next page)

(Turn over)

- (b) Give another example of the use of THIS lever system, at the ankle, in a sporting situation of your choice.
(1 mark)

(Question continues on next page)

- (c) The lever system being used in FIGURE 5 provides a mechanical advantage.

Define the meaning of the term mechanical advantage.
(1 mark)

(Total for Question 5 = 3 marks)

6 Complete the following statements about movement patterns.

(a) Movement patterns occur in body planes and around

(1 mark)

(b) There are three main body planes: sagittal, transverse and

(1 mark)

(c) A tucked front somersault takes place in the sagittal plane around the

(1 mark)

(d) A full twist occurs in the transverse plane around the

(1 mark)

(Total for Question 6 = 4 marks)

(Turn over)

7 Health and fitness can be affected by exercise.

(a) Define the terms health and fitness.

(i) Health (1 mark)

(Continue answer on next page)

(ii) Fitness (1 mark)

(Question continues on next page)

(b) State, using an example, how exercise can affect health and fitness.

(i) Effect of exercise on health (2 marks)

(Continue answer on next page)

(ii) Effect of exercise on fitness (2 marks)

(Total for Question 7 = 6 marks)

8 To make sure training is effective it should be monitored.

Explain why it is important to use fitness tests to monitor a training programme. (3 marks)

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(Total for Question 8 = 3 marks)

9 Fitness tests are designed to test specific components of fitness.

Complete TABLE 3 by:

- (a) Stating the fitness test used to measure the component of fitness.**
- (b) Stating a different sport or physical activity, for each of the components, in which an excellent rating would be an advantage.**

TABLE 3

Component of fitness	(a) Fitness test to measure the component of fitness	(b) Sport or physical activity which an excellent rating would be an advantage
Cardiovascular fitness	(1 mark)	(1 mark)
Speed	(1 mark)	(1 mark)

(Question continues on next page)

(Turn over)

- (c) Georgia is a long distance swimmer. She took part in some fitness tests. Her ratings for these fitness tests are shown in TABLE 4.

TABLE 4

FITNESS TEST	RATING
Illinois agility run test	Excellent
Vertical jump test	Excellent
One-minute press-up test	Poor
Harvard step test	Excellent

Identify, using the data in TABLE 4, the component of fitness Georgia should focus on to improve her long distance swimming. (1 mark)

(Question continues on next page)

- (d) Explain ONE fitness class Georgia should attend to make her performance in the Harvard step test even better. (3 marks)

(Total for Question 9 = 8 marks)

10 Maddie is a 15-year-old cross-country runner. She trains regularly for her event.

An outline of one week of her training is shown in TABLE 5.

TABLE 5

DAY OF WEEK	ACTIVITY	LENGTH OF SESSION
Sunday	Run at varying intensities through woodland	60 minutes
Monday	Rest	
Tuesday	Laps around the park varying her pace, running at 60% – 80% of her maximum heart rate	75 minutes
Wednesday	Rest	
Thursday	Run at varying intensities along the beach	60 minutes
Friday	Rest	
Saturday	X-country race	

(Continues on next page)

Use the information in TABLE 5 to answer all parts of this question.

- (a) Identify the training method Maddie is using in her training sessions. (1 mark)

- (b) State the component of fitness Maddie is training in these sessions. (1 mark)

(Question continues on next page)

(c) Explain TWO principles of training Maddie has applied to her training sessions.

(i) Principle of training 1 (2 marks)

(Continue answer on next page)

(ii) Principle of training 2 (2 marks)

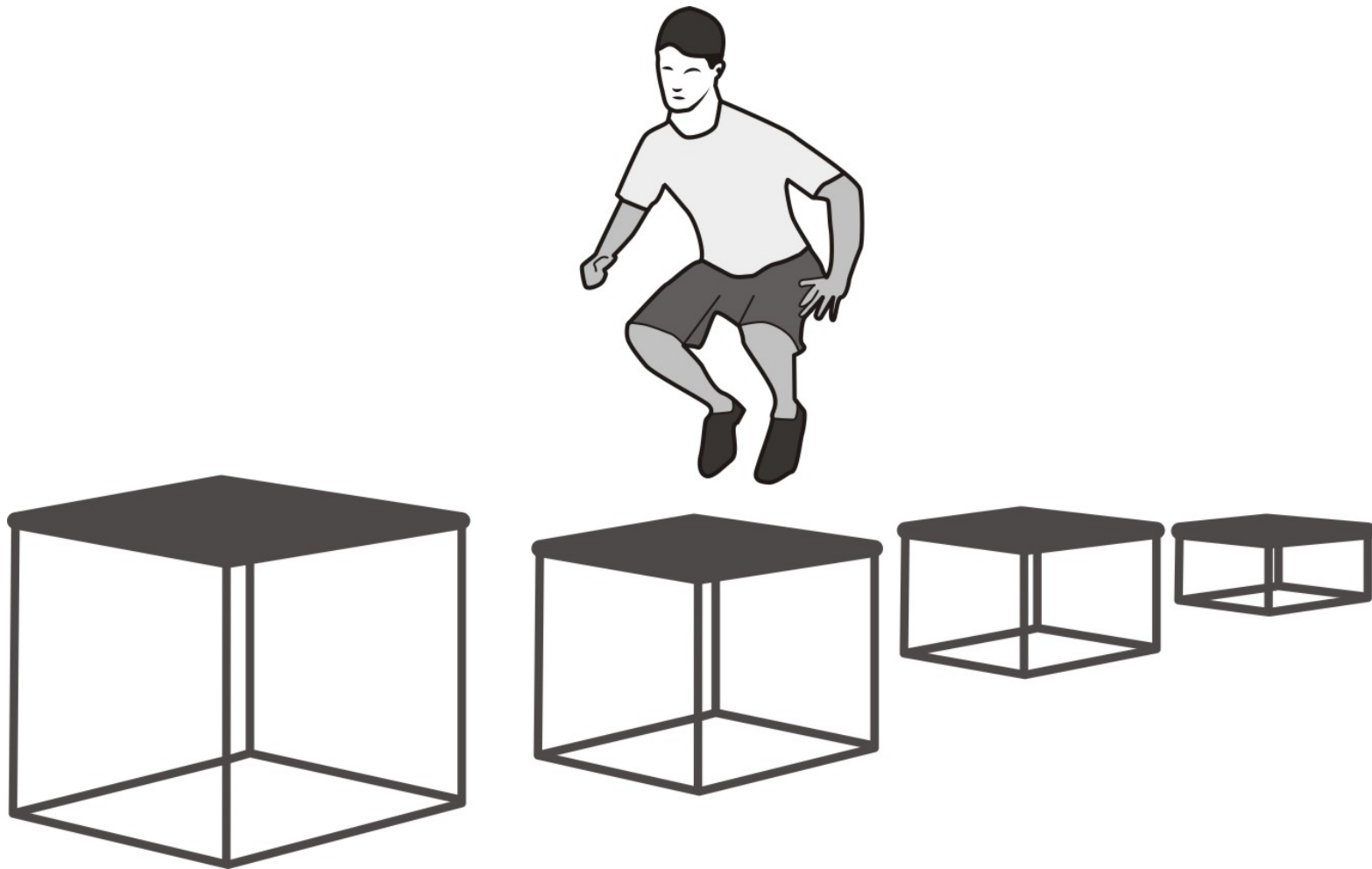
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- (d) Give an example that shows how Maddie could apply the principle of progressive overload to one of her training sessions. (1 mark)

(Total for Question 10 = 7 marks)

11 **FIGURE 6 shows Mason during a training session.**

FIGURE 6



- (a) Identify, using FIGURE 6, the method of training Mason is using. (1 mark)

(Question continues on next page)

(Turn over)

(b) State ONE advantage and ONE disadvantage of the training method shown in FIGURE 6.

(i) Advantage (1 mark)

(ii) Disadvantage (1 mark)

(Total for Question 11 = 3 marks)

(Turn over)

- 12 Performers who take performance enhancing drugs (PED) risk disqualification and ill-health but still take them for the benefits they can bring.**

Complete TABLE 6 by:

- (a) Stating a positive effect of the PED.**
- (b) Identifying a sport or physical activity where taking the PED would increase chance of success in that sport or physical activity.**

TABLE 6

	(a) Positive effect of the PED	(b) Sport or physical activity where taking the PED would increase chance of success
Anabolic steroids	(1 mark)	(1 mark)
Beta blockers	(1 mark)	(1 mark)

(Total for Question 12 = 4 marks)

- 13 Tennis players will work at different intensities during a match.**

FIGURE 7 shows three different phases of a tennis match.

FIGURE 7



During a serve



During a long intense rally



Resting between games

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(Turn over)

Examine the importance of the respiratory system during the different phases shown in FIGURE 7. (9 marks)

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(Turn over)

(Continue answer on next page)

(Turn over)

(Continue answer on next page)

(Turn over)

(Turn over)

(Total for Question 13 = 9 marks)

14 Dan trains regularly to improve his shot put performance and his general fitness.

FIGURE 8 shows Dan during a shot put competition.

TABLE 7 shows some of the long-term training effects on his body systems.

FIGURE 8



TABLE 7

LONG-TERM TRAINING EFFECTS
Increased bone density
Decreased resting heart rate
Muscle hypertrophy

(Continues on next page)

Evaluate the training methods causing these long-term effects and their impact on Dan's shot put performance. (9 marks)

[illegible]

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(Continue answer on next page)

(Turn over)

(Total for Question 14 = 9 marks)

TOTAL FOR PAPER = 90 MARKS

Sources

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Q2, Figure 3:

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Q3, Figure 4:

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Q5, Figure 5:

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Q13, Figure 7:

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Q14, Figure 8:

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