Please check the examination details below before entering your candidate information

Candidate surname	Other names

Centre Number | Learner Registration Number

Pearson BTEC Level 3 Nationals Certificate

Wednesday 15 May 2024

Afternoon (Time: 1 hour 30 minutes)

Paper reference **31524H**

Sport

UNIT 1: Anatomy and Physiology

You do not need any other materials.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and learner registration 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 80.
- 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.

Turn over ▶

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SECTION A: The Skeletal System for Sports Performance

Answer ALL questions. Write your answers in the spaces provided.

1 Complete **Table 1** by identifying **each** type of bone given**.**

Example	Type of bone
Cranium	
Tarsals	
Ulna	
Vertebrae	

Table 1

(Total for Question 1 = 4 marks)

Fran is a footballer. The functions of her skeleton are vital for her participation in a game of football. Two of these functions are leverage and weight bearing.

2 Describe how **two other** functions of the skeleton support Fran when playing football.

(Total for Question 2 = 4 marks)

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Julian is a cricketer. **Figure 1** shows him bowling.



Figure 1

(Source: © Irfan H/Shutterstock)

3 (a) State the movement that is taking place at the shoulder joint of Julian's bowling arm (left arm).

(1)

.....

(b) State the type of synovial joint at his shoulder.

(1)

.....

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(c) Explain how the articular cartilage enables Julian to bowl successfully in cricket.

(3)

(Total for Question 3 = 5 marks)

TOTAL FOR SECTION A = 13 MARKS

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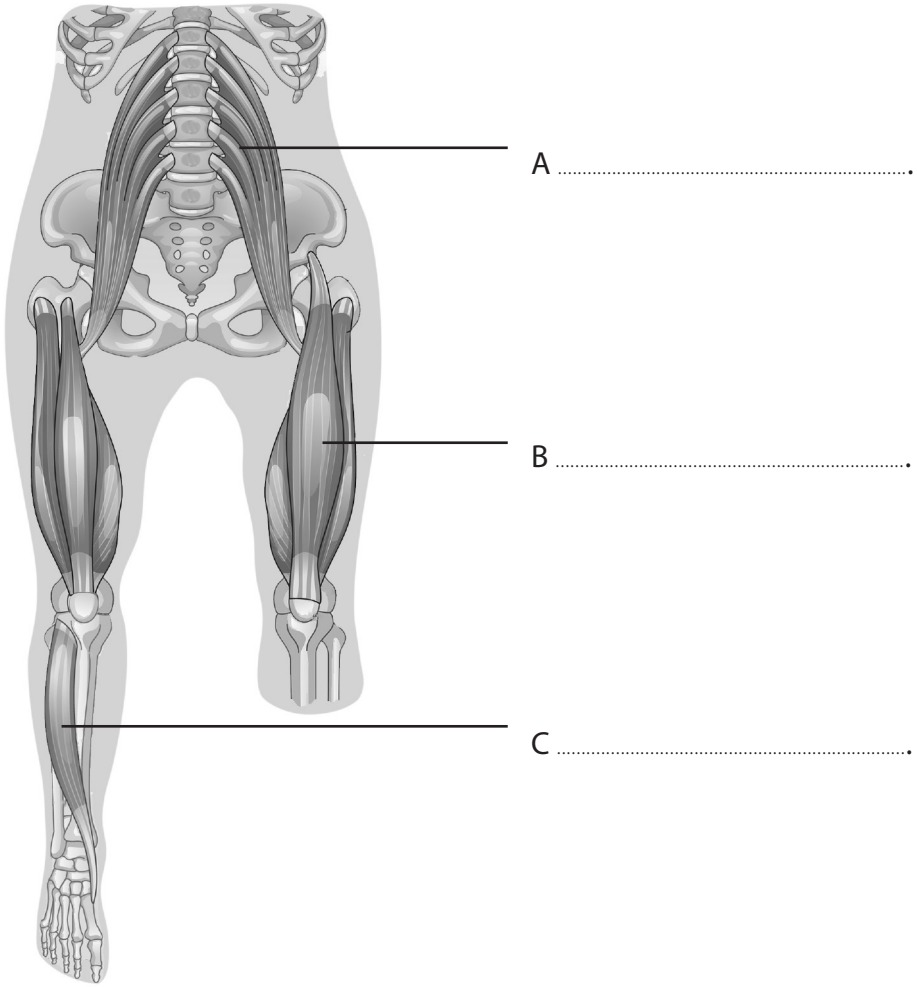
SECTION B: The Muscular System for Sports Performance

Answer ALL questions. Write your answers in the spaces provided.

Figure 2 shows the muscles in the lower body.

4 Identify the muscles labelled **A–C**.

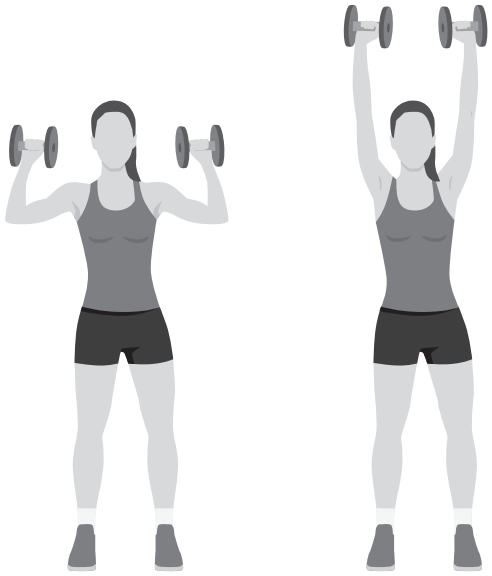


(Source: © VectorMine/Shutterstock)

Figure 2

(Total for Question 4 = 3 marks)

Figure 3 shows Pippa performing a shoulder press.



(Source: © Lio putra/Shutterstock)

Figure 3

5 Complete **Table 2** for the upwards phase of the shoulder press by stating:

(a) the agonist muscle

(1)

(b) the type of contraction of the agonist muscle

(1)

(c) the antagonist muscle.

(1)

	Upward phase
Agonist	(a)
Type of contraction	(b)
Antagonist	(c)

Table 2

(Total for Question 5 = 3 marks)

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Asim is 60 years old and he stopped going to the gym 10 years ago. Recently he has started to go to the gym again.

6 Describe how the ageing process affects muscle mass.

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.....

.....

.....

(Total for Question 6 = 2 marks)

Lottie is a javelin thrower.

As part of her training programme she participates in three gym-based sessions using heavy weights.

One response to Lottie's muscular system is microtears in the muscle.

7 (a) State **two other** responses of the muscular system to exercise or lifting weights.

(2)

1 .....

2 .....

(b) Explain the impact of microtears on the strength of Lottie's muscles.

(3)

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.....

(Total for Question 7 = 5 marks)

TOTAL FOR SECTION B = 13 MARKS

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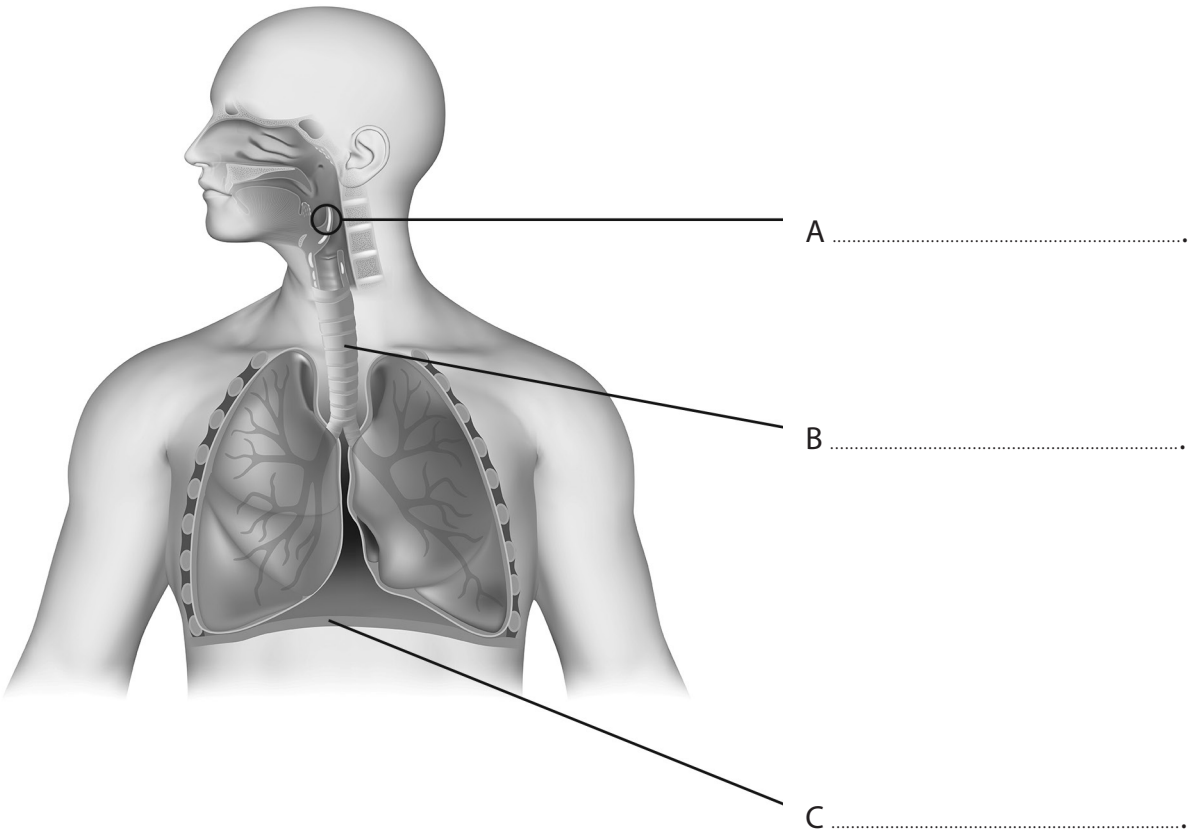
SECTION C: The Respiratory System for Sports Performance

Answer ALL questions. Write your answers in the spaces provided.

Figure 4 shows the structure of the respiratory system.

8 (a) Identify the structures labelled **A–C**.

(3)



(Source: © Alila Medical Media/Shutterstock)

Figure 4

(b) Describe the role of the external intercostal muscles during inspiration.

(2)

.....

.....

.....

.....

(Total for Question 8 = 5 marks)

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Destiny is a badminton player who has asthma. She plays badminton three times per week.

9 (a) Describe asthma.

(2)

(b) Explain the impact of regular participation in badminton on oxygen and carbon dioxide diffusion rates **and** how this affects Destiny's badminton performance.

(3)

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When Destiny is playing a match, some of her lung volumes change.

(c) Analyse the changes to Destiny's lung volumes and the impact this will have on her badminton performance.

(6)

(Total for Question 9 = 11 marks)

TOTAL FOR SECTION C = 16 MARKS

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SECTION D: The Cardiovascular System for Sports Performance

Answer ALL questions. Write your answers in the spaces provided.

Figure 5 shows the nervous control of the cardiac cycle.

10 Identify the structures labelled **A–D**.

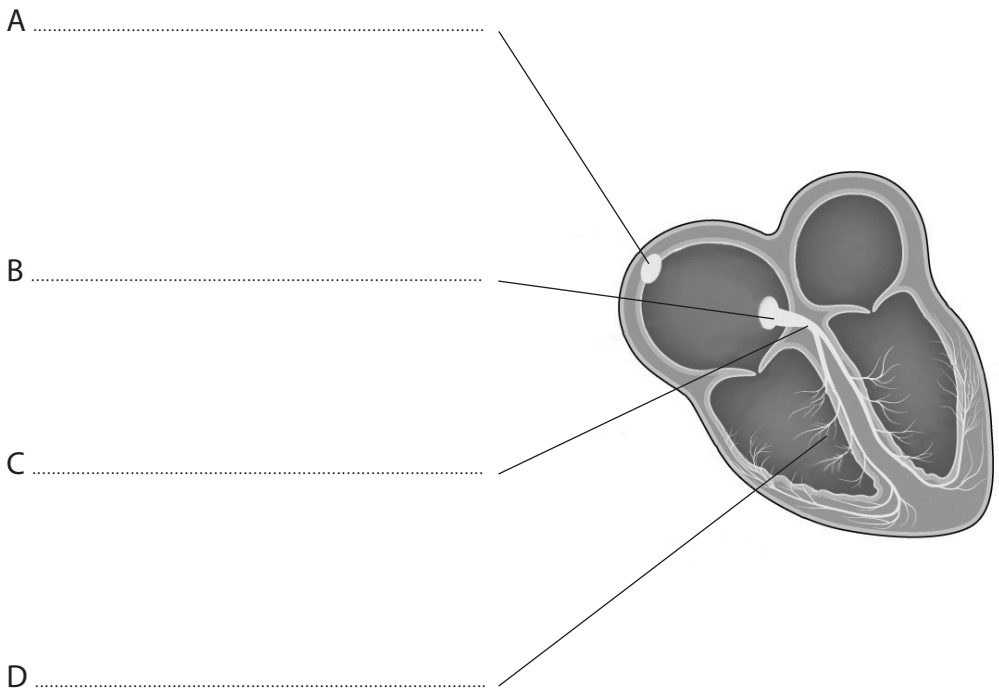

Figure 5

(Total for Question 10 = 4 marks)

11 Describe the effect of the parasympathetic nervous system on the heart at the end of an exercise session.

.....

.....

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.....

(Total for Question 11 = 2 marks)

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12 Describe how the cardiovascular system removes waste products.

(Total for Question 12 = 3 marks)

Jim is a long-distance runner. During a training session his cardiovascular system responds to exercise. Two of these responses are increased heart rate and increased cardiac output.

13 (a) State **two other** responses of the cardiovascular system during a training session.

(2)

1 .....

2 .....

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(b) Analyse how an increased heart rate and increased cardiac output allow Jim to complete his run.

(6)

(Total for Question 13 = 8 marks)

TOTAL FOR SECTION D = 17 MARKS

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SECTION E: Energy Systems for Sports Performance

Answer ALL questions. Write your answers in the spaces provided.

14 Complete **Table 3** for the lactate energy system by stating:

(a) the intensity

(1)

(b) the duration

(1)

(c) the recovery time.

(1)

	Lactate system
Intensity	(a)
Duration	(b)
Recovery time	(c)

Table 3

(Total for Question 14 = 3 marks)

Eve is a netball player. She has diabetes and has missed a meal before her match.

15 Explain **one** possible effect of missing a meal before a match for a player with diabetes.

(Total for Question 15 = 4 marks)

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Sam is a shot putter. He makes three throws in the first round of a shot putting competition to qualify for a place in the second round of the competition.

16 Analyse the main energy system used in shot put.

(Total for Question 16 = 6 marks)

TOTAL FOR SECTION E = 13 MARKS

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SECTION F: Interrelationships between Body Systems for Sports Performance.

Answer the question. Write your answer in the space provided.

Mina is a long-distance cyclist. Each cycle race is 50 miles long. Mina has been training and riding competitively for 10 years, so her respiratory and muscular systems have adapted.

17 Analyse how the adaptations of Mina's respiratory and muscular systems affect her cycling performance.

(8)

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(Total for Question 17 = 8 marks)

TOTAL FOR SECTION F = 8 MARKS
TOTAL FOR PAPER = 80 MARKS

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