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

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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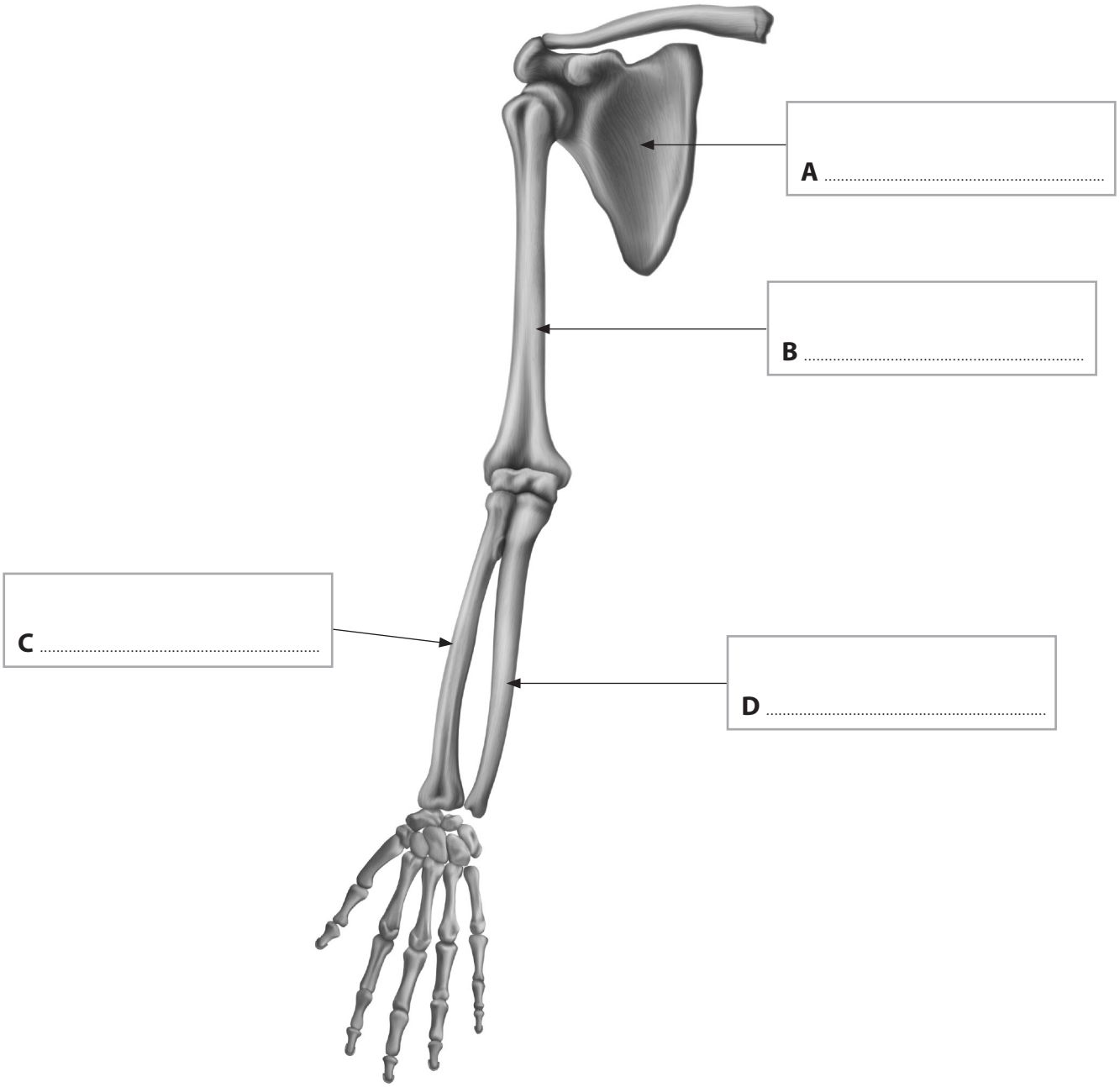
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Section A: The Skeletal System for Sports Performance

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

1 (a) Identify the bones labelled **A–D**.

(4)



(Source: © Shutterstock)

Figure 1

(b) State the type of synovial joint that is found at the shoulder.

(1)

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(Total for Question 1 = 5 marks)

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Warren is a rugby player. He uses different bone types to perform successfully in a match. Two of these bone types are flat bones and long bones.

2 (a) Explain why flat bones **and** long bones help Warren when playing a match.

(4)

(b) State **one** type of bone other than flat and long bones.

(1)

(Total for Question 2 = 5 marks)

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Zara is a badminton player. During a game she regularly runs, jumps and changes direction.

3 Explain why regular participation in weight-bearing activities helps to reduce the likelihood of osteoporosis.

(Total for Question 3 = 3 marks)

TOTAL FOR SECTION A = 13 MARKS

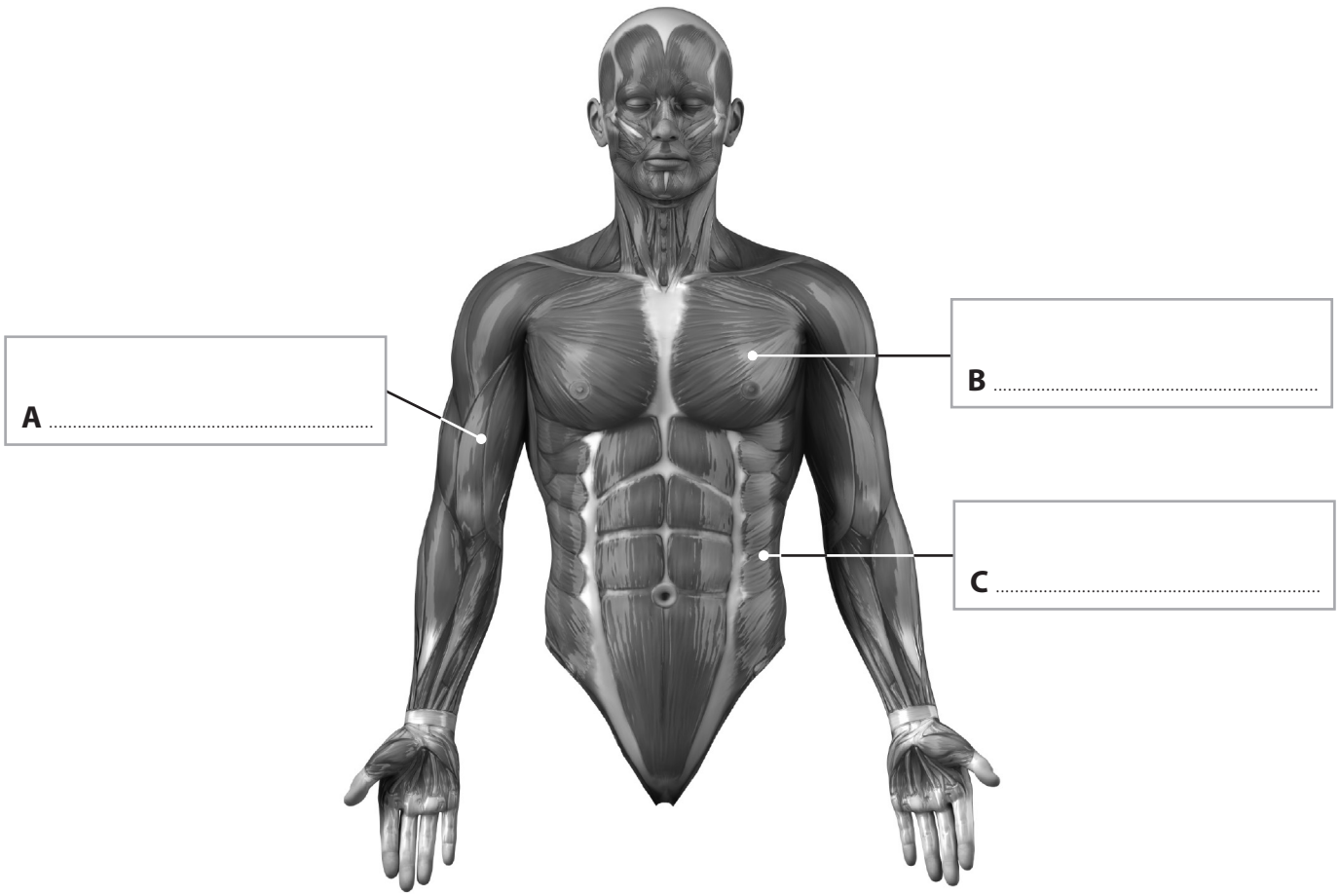
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SECTION B: The Muscular System for Sports Performance

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

Figure 2 shows the muscles in the upper body.

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



(Source: © Shutterstock)

Figure 2

(Total for Question 4 = 3 marks)

5 State **three** types of skeletal muscle fibre.

1 .....

2 .....

3 .....

(Total for Question 5 = 3 marks)

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6 Describe, using an example of a sporting action, the role of an agonist muscle.

(Total for Question 6 = 2 marks)

Sundeep is a 400 m runner.

As part of his training regime he participates in two track sessions per week. One response that occurs during a training session is that his muscles increase in temperature.

7 (a) Explain how increased muscle temperature will affect Sundeep when running.

(2)

Over a period of time, Sundeep's muscular system has adapted to the training programme, causing an increased tolerance to lactate.

(b) Explain the impact an increase in tolerance to lactate has on Sundeep's 400 m running performance.

(3)

(Total for Question 7 = 5 marks)

TOTAL FOR SECTION B = 13 MARKS

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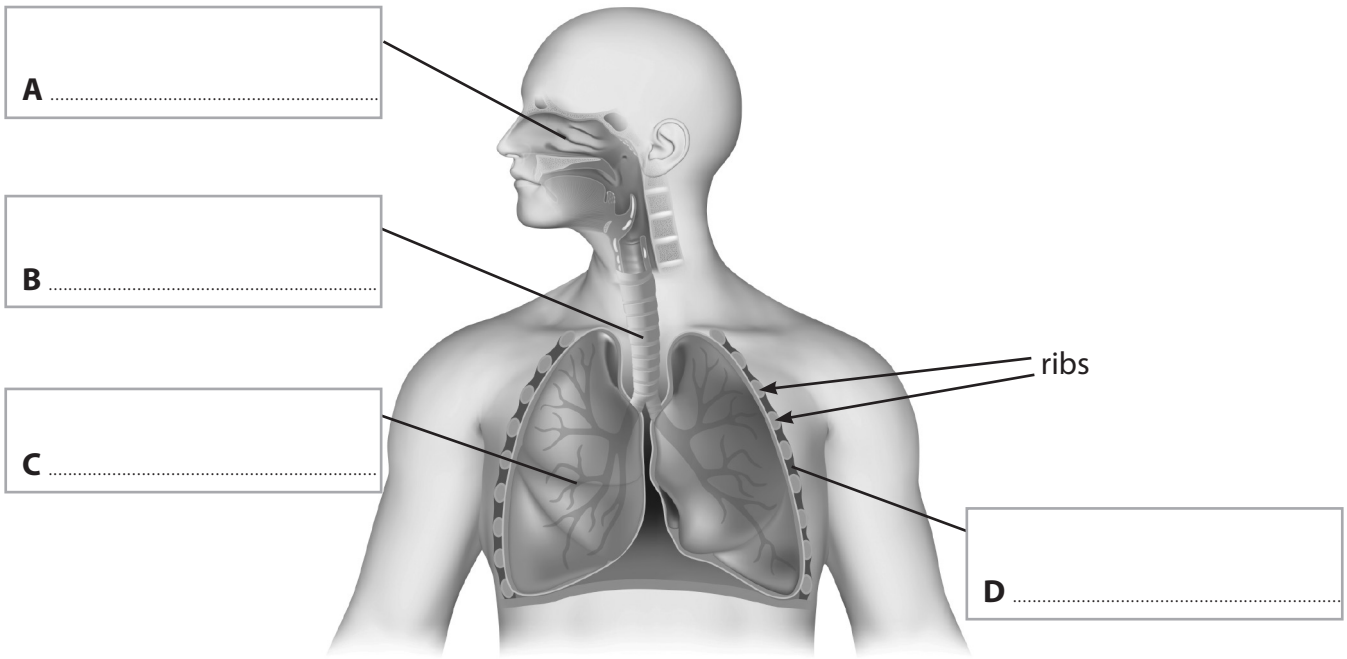
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SECTION C: The Respiratory System for Sports Performance

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

Figure 3 shows the structure of the respiratory system.

8 Identify the respiratory structures labelled **A–D**.



(Source: © Shutterstock)

Figure 3

(Total for Question 8 = 4 marks)

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Ethan is a 1500 m swimmer.

9 (a) Explain **two** immediate respiratory responses for Ethan when he starts swimming in a 1500 m race.

(4)

(b) Describe how the chemical control of breathing changes Ethan's minute ventilation (VE) during the swim.

(2)

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(c) Analyse the gaseous exchange process that makes sure that Ethan sustains his performance throughout his swim.

(6)

(Total for Question 9 = 12 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 4 is an incomplete flow diagram of the structures in the heart that control the cardiac cycle.

10 Identify the **two** structures needed to complete the flow diagram in **Figure 4**.

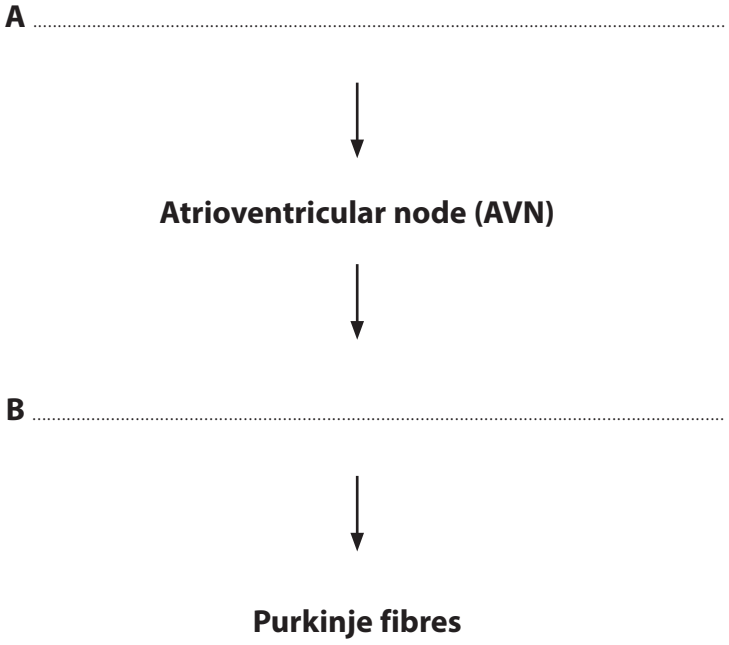


Figure 4

(Total for Question 10 = 2 marks)

11 Describe the role of the Purkinje fibres.

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.....

(Total for Question 11 = 2 marks)

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12 Describe hypothermia.

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(Total for Question 12 = 2 marks)

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Ashley is a tennis player and is preparing for a match. Her heart rate starts to increase just before the match.

13 (a) Explain why Ashley's heart rate increases just before the match and the impact of this increase on her performance.

(4)

(b) Name the blood vessel that returns blood back to Ashley's right atrium.

(1)

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(c) Analyse how the sympathetic nervous system controls the changes in Ashley's cardiac cycle during her tennis match, and the impact of this control on her performance.

(6)

(Total for Question 13 = 11 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.

Luke is a decathlete. He participates in a number of different events across two days. These events use all of his energy systems.

On day one, the high jump is one of these events.



(Source: © Shutterstock)

Figure 5

14 Explain why the ATP-PC energy system is used when participating in the high jump.

(Total for Question 14 = 3 marks)

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On day one, the last event is the 400 m run.

15 Describe how the **lactate system** provides energy for the 400 m run.

(Total for Question 15 = 4 marks)

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On day two, the last event is the 1500 m run. Luke completes the run in 4 minutes and 25 seconds.

16 Evaluate the contributions of each of the **three** energy systems throughout Luke's 1500 m run.

(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.

Figure 6 shows Sammy in action during a game of football.



Position A Position B

Figure 6

17 Analyse how the muscular system and the skeletal system work together at the hip, knee and ankle joints to allow Sammy's right leg, shown shaded in **Figure 6**, to move from Position A to Position B to strike the football.

(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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