Please check the examination details below before entering your candidate information

Candidate surname	Other names

Pearson BTEC Level 3 Nationals Certificate

Centre Number | Learner Registration Number

Tuesday 21 May 2019

Morning (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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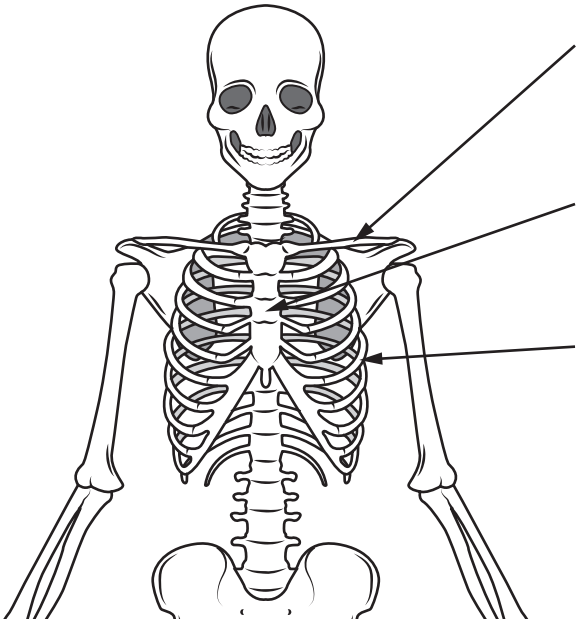
Pearson

SECTION A: The Skeletal System for Sports Performance

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

Figure 1 shows the bones of the upper body.

1 Identify the bones labelled **A-C**.



A ..... **(1)**

B ..... **(1)**

C ..... **(1)**

Figure 1

(Total for Question 1 = 3 marks)

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Joints are classified by how much movement they allow.

One category of classification is a fibrous joint.

2 (a) Give an example of a fibrous joint.

(1)

.....

(b) State **two** characteristics of a fibrous joint.

(2)

1 .....

.....

2 .....

.....

(Total for Question 2 = 3 marks)

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Alice is a 12-year-old athlete. She participates in a variety of events that involve running and jumping.

3 (a) Explain why regular participation in weight-bearing activities will help reduce the likelihood of osteoporosis.

(4)

Alice wanted to start resistance (weight) training, but has been told by her doctor that she is too young to do so.

(b) Explain why resistance (weight) training is not recommended for children.

(3)

(Total for Question 3 = 7 marks)

TOTAL FOR SECTION A = 13 MARKS

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**.

A ..... **(1)**

B ..... **(1)**

C ..... **(1)**

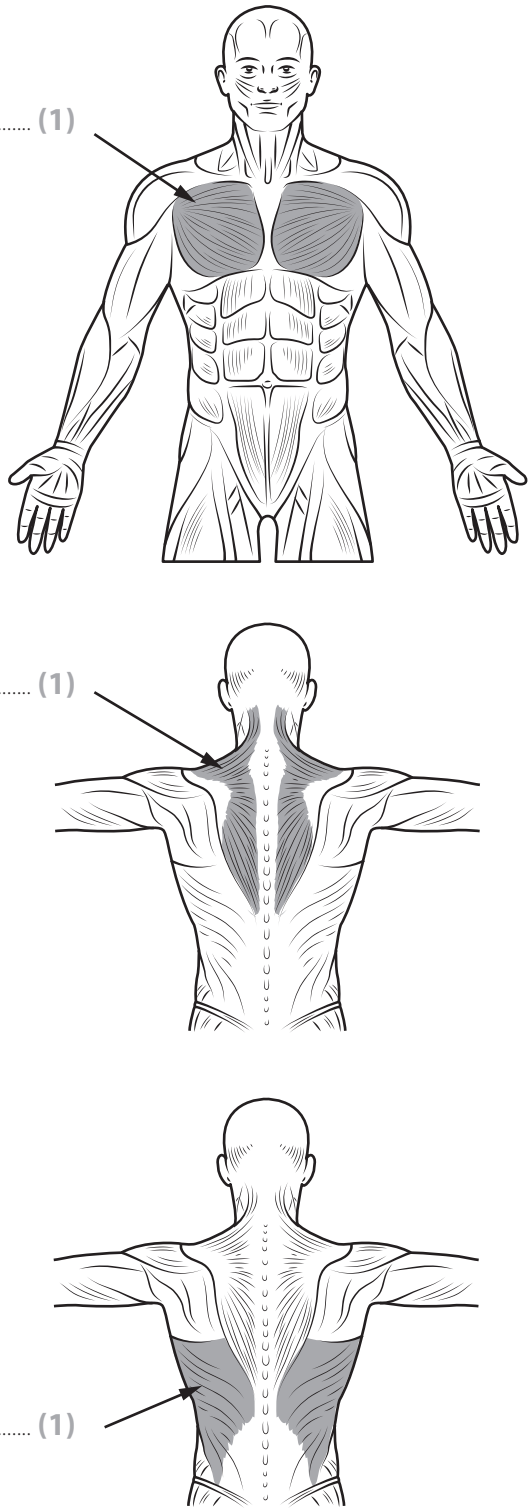

Figure 2

(Total for Question 4 = 3 marks)

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5 State **three** characteristics of type IIx muscle fibres.

1 .....

.....

2 .....

.....

3 .....

.....

(Total for Question 5 = 3 marks)

6 State **two** characteristics of smooth muscle.

1 .....

.....

2 .....

.....

(Total for Question 6 = 2 marks)

Julie is a marathon runner.

Julie has trained for many years so her body has adapted to increase the storage of muscle glycogen.

7 (a) Explain why an increased storage of muscle glycogen benefits Julie during a race.

(2)

Julie is on a training run. One response to the run is that the temperature of her muscles increases.

(b) Explain what causes muscle temperature to increase during exercise.

(3)

(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.

8 Describe the mechanism of breathing for **expiration** at rest.

(Total for Question 8 = 4 marks)

9 (a) State the meaning of the term 'vital capacity'.

(1)

(b) State the effect that altitude has on a person's breathing rate.

(1)

(Total for Question 9 = 2 marks)

Shelly is a cross country runner. During a training run her tidal volume increases.

10 (a) Explain the effects an increased tidal volume would have on Shelly's cross country performance.

(4)

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During the training session, Shelly's breathing rate increases.

(b) Analyse how Shelly's increased breathing rate is controlled.

(6)

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(Total for Question 10 = 10 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.

11 Name the structures **A–D** described in **Table 1**.

Structure	Description
A-	The body's main artery, originating from the left ventricle and carries oxygenated blood.
B-	A blood vessel that receives de-oxygenated blood from the body to empty into the right atrium.
C-	Blood vessel that supplies oxygenated blood to the heart muscle.
D-	Prevents backflow of blood into the ventricle.

Table 1

(Total for Question 11 = 4 marks)

12 Describe sudden arrhythmic death syndrome (SADS).

.....

.....

.....

.....

(Total for Question 12 = 2 marks)

Imran is a rugby player. He has been playing for several years and his body has undertaken cardiovascular adaptations. One of these adaptations is a decreased heart rate recovery time.

13 (a) Explain how a decreased heart rate recovery time benefits Imran's rugby performance.

(2)

.....

.....

.....

.....

.....

.....

Imran is playing in a rugby match.

In the match, Imran's cardiac output changes from rest.

(b) (i) State what happens to Imran's cardiac output during a rugby game.

(1)

.....

(ii) State the **two** cardiovascular responses of the body that cause this change in cardiac output.

(2)

1 .....

2 .....

Figure 3 shows Imran's distribution of blood flow at rest and during the rugby game.

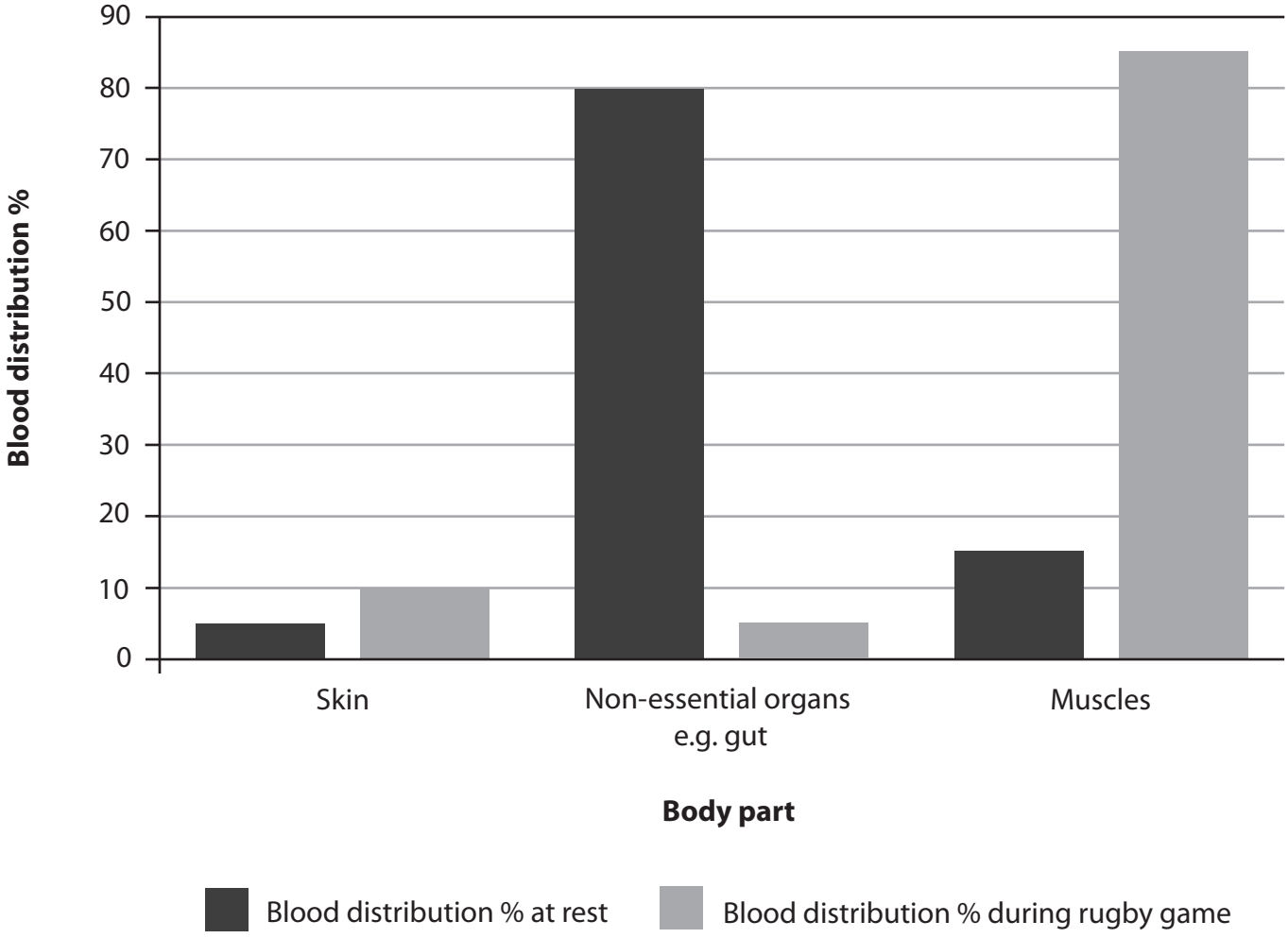

Figure 3

(c) Analyse, using **Figure 3**, the changes in distribution of Imran's blood flow to his skin, non-essential organs and muscles when playing rugby.

(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.

14 Describe the process of the electron transport chain.

(Total for Question 14 = 4 marks)

15 Describe the process of aerobic glycolysis.

(Total for Question 15 = 3 marks)

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Andre is an elite tennis player.

Figure 4 shows the contribution of the energy systems during a tennis match.

Energy system	Contribution %
ATP-PC	70
Lactate	20
Aerobic	10

Figure 4

16 Assess the contribution of the energy systems during Andre's tennis match.

(6)

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

Callum is a hockey player. He tested his fitness at the start and at the end of his three-month training programme. The tests showed significant improvements to Callum's cardiovascular and respiratory systems.

17 Analyse how the adaptations to Callum's cardiovascular and respiratory systems will affect his fitness for playing hockey.

(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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