Write your name here

Surname	Other names

Pearson BTEC Level 3 Nationals Certificate

Centre Number

Learner Registration Number

Sport

Unit 1: Anatomy and Physiology

Monday 22 January 2018 – Afternoon
Time: 1 hour 30 minutes

Paper Reference
31524H

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

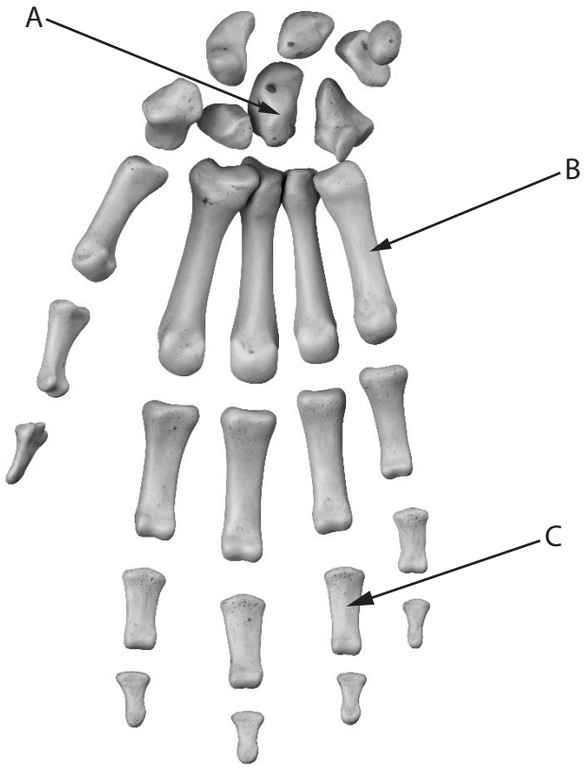
The Skeletal System for Sports Performance

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

Figure 1 shows the bones of the hand.

1 (a) Name the bones labelled A–C in **Figure 1**.

(3)



(Source: © Sebastian Kaulitzki/Shutterstock)

Figure 1

A .....

B .....

C .....

Efi has been playing rugby for 5 years. Efi's skeletal system has adapted during those 5 years.

(b) Explain **two** long-term adaptations to Efi's skeletal system from playing rugby.

(4)

(i) .....

.....

.....

.....

(ii) .....

.....

.....

.....

(c) A bursa is a fluid filled sac in most synovial joints.

Explain the function of a bursa.

(3)

(Total for Question 1 = 10 marks)

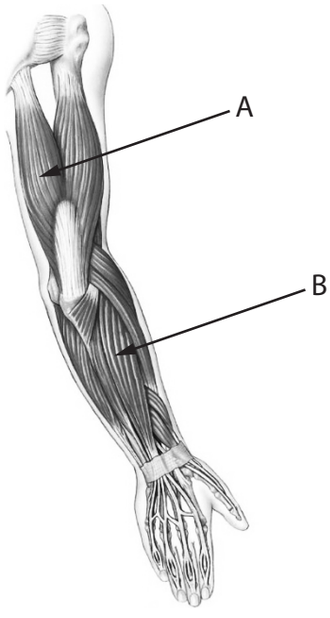
TOTAL FOR SECTION A = 10 MARKS

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 human arm.



Palm facing down

Figure 2

2 Name the muscles labelled A and B in **Figure 2**.

A .....

B .....

(Total for Question 2 = 2 marks)

Frances is a 100 m sprinter. She uses weights as part of her training schedule.

3 (a) Explain the role of a fixator muscle during a weight training exercise.

(3)

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.....

Figure 3 shows Frances completing a concentric contraction of her quadriceps.

(Source: © Syda Productions/Shutterstock)

Figure 3

(b) Describe a concentric contraction.

(2)

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.....

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.....

There are a number of short-term responses in Frances's muscular system during these weight training sessions for power.

One of these short-term responses is an increased muscle pliability.

(c) Explain why there is an increased muscle pliability **and** explain how this affects Frances.

(3)

(Total for Question 3 = 8 marks)

TOTAL FOR SECTION B = 10 MARKS

SECTION C

The Respiratory System for Sports Performance

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

4 (a) State the meaning of the term 'residual volume'.

(2)

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.....

(b) Give the residual volume, including units, for an average, healthy, adult male.

(1)

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.....

(Total for Question 4 = 3 marks)

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Farzana is a 10,000 m runner. She is in the middle of her athletics season. She is competing in races and she is also doing her training programme.

5 (a) Explain **two** immediate respiratory responses for Farzana when she is competing in a 10,000 m race.

(4)

(i) .....

.....

.....

.....

(ii) .....

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.....

One of the long-term adaptations that has occurred in Farzana's respiratory system following her training programme is an increase in her vital capacity.

(b) Explain how increasing vital capacity will help Farzana's performance in a 10,000 m race.

(4)

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(c) Analyse the gaseous exchange process that ensures Farzana sustains her performance throughout the 10,000 m race.

(6)

(Total for Question 5 = 14 marks)

TOTAL FOR SECTION C = 17 MARKS

SECTION D

The Cardiovascular System for Sports Performance

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

6 State the component of blood that carries most oxygen.

.....

(Total for Question 6 = 1 mark)

7 (a) State the function of the pulmonary artery.

(1)

.....

.....

.....

(b) State the function of the tricuspid valve.

(2)

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(Total for Question 7 = 3 marks)

Freddie is an open water swimmer. **Figure 4** shows his heart rate before, during and after a 10-minute training swim.

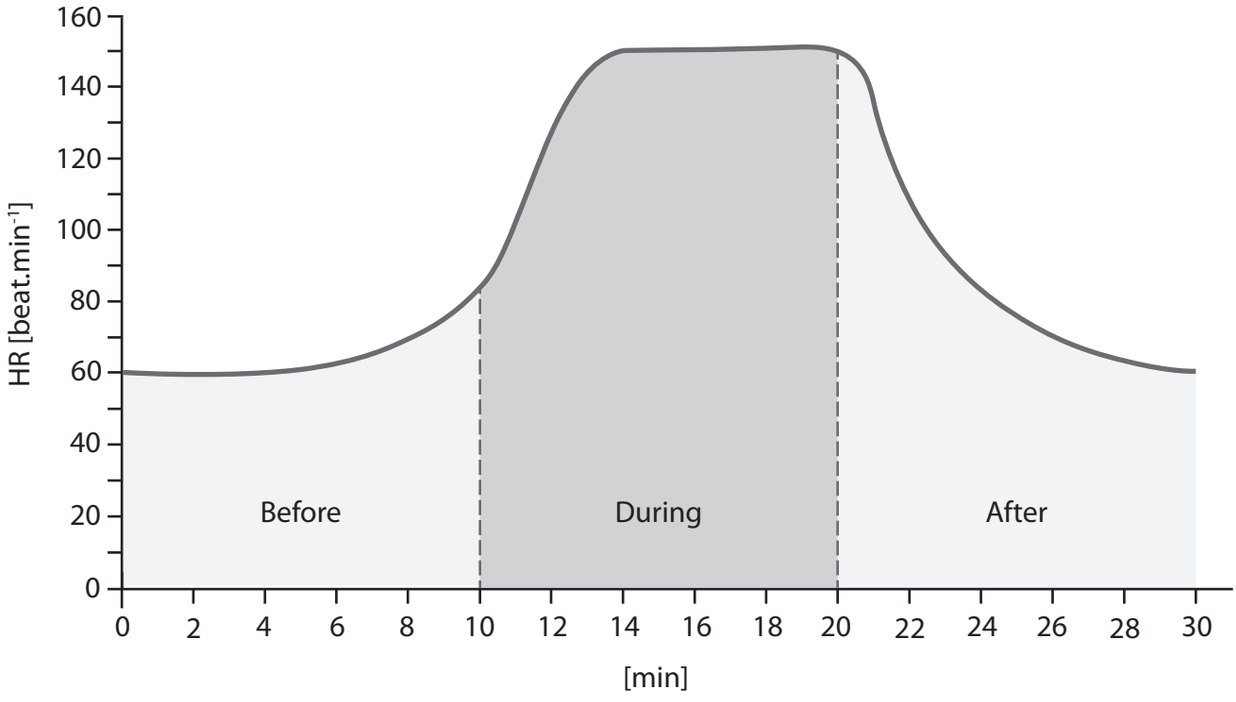

Figure 4

8 (a) (i) Explain the changes to Freddie's heart rate before the swim.

(2)

.....

.....

.....

.....

(ii) Explain the changes to Freddie's heart rate during the swim.

(3)

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.....

(b) Describe how nervous control of the cardiac cycle decreases Freddie's heart rate when the training swim has finished.

(5)

Freddie has just completed a long training session in cold water. His coach notices that Freddie has slurred speech and is confused. The coach thinks that Freddie might be suffering from hypothermia.

(c) Analyse the effects that hypothermia could have on Freddie's cardiovascular system.

(6)

(Total for Question 8 = 16 marks)

TOTAL FOR SECTION D = 20 MARKS

SECTION E

Energy Systems for Sports Performance

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

9 Complete the following table by stating the chemical source and amount of ATP produced for both the ATP-PC and aerobic energy system.

Energy System	Chemical Source/Fuel(s)	Amount of ATP produced
ATP-PC	.....	.....
Aerobic	(i) Glycogen ..... (ii)	.....

(Total for Question 9 = 4 marks)

10 Describe the process of the Krebs cycle.

(Total for Question 10 = 5 marks)

11 Evaluate the importance of the ATP-PC energy system for elite marathon runners in a race.

(Total for Question 11 = 6 marks)

TOTAL FOR SECTION E = 15 MARKS

SECTION F

Interrelationships between Body Systems for Sports Performance

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

Paula is a football player. She has completed a pre-season training plan resulting in long-term adaptations to her cardiovascular and energy systems.

12 Analyse how long-term adaptations of Paula's cardiovascular and energy systems affect her football performance.

(8)

(Total for Question 12 = 8 marks)

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

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