OCR
Oxford Cambridge and RSA

Thursday 9 January 2025 – Morning

Level 3 Cambridge Technical in Sport and Physical Activity

05826/05827/05828/05829/05872 Unit 1: Body systems and the effects of physical activity

Time allowed: 1 hour 30 minutes
C400/2501

You can use:
- a calculator

Please write clearly in black ink. **Do not write in the barcodes.**

Centre number | | | | | | Candidate number | | | | |

First name(s) _____

Last name _____

Date of birth | D | D | M | M | Y | Y | Y | Y |

INSTRUCTIONS
- Use black ink. You can use an HB pencil, but only for graphs and diagrams.
- Write your answer to each question in the space provided. If you need extra space use the lined pages at the end of this booklet. The question numbers must be clearly shown.
- Answer **all** the questions.
- Where appropriate, your answer should be supported with working. Marks might be given for using a correct method, even if your answer is wrong.

INFORMATION
- The total mark for this paper is **70**.
- The marks for each question are shown in brackets **[ ]**.
- Quality of written communication will be assessed in questions marked with an asterisk (*).
- This document has **16** pages.

ADVICE
- Read each question carefully before you start your answer.

Section A

Put a tick (✓) in the box next to the **one** correct answer for each of the questions 1 to 8.

1 Which one of the following muscles contracts to cause movement at the shoulder?

(a) Iliopsoas ☐

(b) Latissimus dorsi ☐

(c) Soleus ☐

(d) Vastus lateralis ☐

[1]

2 Which one of the following sections of the vertebral column is **above** the thoracic vertebrae when an individual is standing up?

(a) Cervical vertebrae ☐

(b) Coccyx ☐

(c) Lumbar vertebrae ☐

(d) Sacrum ☐

[1]

3 Which one of the following shows the correct order in which air travels into the lungs during inspiration?

(a) Bronchus → bronchiole → trachea ☐

(b) Bronchiole → trachea → bronchus ☐

(c) Trachea → bronchus → bronchiole ☐

(d) Trachea → bronchiole → bronchus ☐

[1]

4 Which one of the following is the timescale for full recovery of the **ATP-PC/alactic** energy system?

(a) 10 seconds ☐

(b) 30 seconds ☐

(c) 3 minutes ☐

(d) 30 minutes ☐

[1]

5 Which one of the following muscles contracts to cause **expiration** during exercise?

(a) Internal intercostal ☐

(b) Pectoralis minor ☐

(c) Scalene ☐

(d) Sternocleidomastoid ☐

[1]

6 Which one of the following statements describes an **isometric** muscle contraction?

(a) Muscle contracts at a constant speed ☐

(b) Muscle length does not change as it contracts ☐

(c) Muscle lengthens under tension ☐

(d) Muscle shortens as it contracts ☐

[1]

7 Which one of the following forms of exercise mainly uses the **ATP-PC/alactic** energy system?

(a) High intensity and long duration ☐

(b) High intensity and short duration ☐

(c) Low intensity and long duration ☐

(d) Low intensity and short duration ☐

[1]

8 Consider the following statements about the cardiovascular system:

A – Cardiac output increases during exercise.
B – Heart rate decreases during exercise.
C – Stroke volume is highest at rest.

Which statements are **incorrect**?

(a) **A** only ☐

(b) **A** and **B** ☐

(c) **B** and **C** ☐

(d) **C** only ☐

[1]

9 Complete the following sentence using the correct word from the word box.

isotonic	partial	synovial	systolic

Gaseous exchange at the lungs is caused by differences in the .....

pressures of gases.

[1]

10 Calculate the stroke volume of an individual during exercise with a heart rate of 110 beats per minute and a cardiac output of 13 200 millilitres per minute. Give your answer in the correct units.

.....

..... **[1]**

Section B

11

(a) The vertebral column is part of the axial skeleton.

Other than the bones of the vertebral column, name **two** different bones of the **axial** skeleton.

1 .....

2 .....

[2]

(b) Name **three** bones in the foot.

1 .....

2 .....

3 .....

[3]

(c) Explain **three** functions of flat bones.

1 .....

.....

2 .....

.....

3 .....

.....

[3]

12 Draw a line to link each structure of a synovial joint to its function.

Structure	Function
Ligament	Reduces friction between bones and connective tissue.
Synovial fluid	Encloses the joint and forms the outer lining of the joint.
Bursa	Lubricates the joint and helps to absorb shock.
Joint capsule	Connects bone to bone and stabilises the joint.

[4]

13 Describe **two** positive long-term effects of exercise on the **skeletal** system.

1 .....

.....

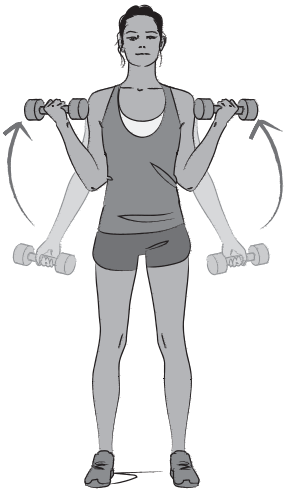
2 .....

.....

[2]

14

(a) The image below shows the upward phase of a biceps curl.



The table identifies **three** muscles involved in a biceps curl and states the function of each.

Complete the table to describe each type of muscle function during the upward phase of the biceps curl.

Muscle	**Function**	**Description of muscle function during the upward phase of a biceps curl**
Biceps brachii	Agonist	....
Triceps brachii	Antagonist	....
Deltoid	Fixator	....

[3]

(b) Complete the paragraph that describes the structure and function of **slow oxidative muscle fibres** using words from the word box.

few	high	low	many	small	strong

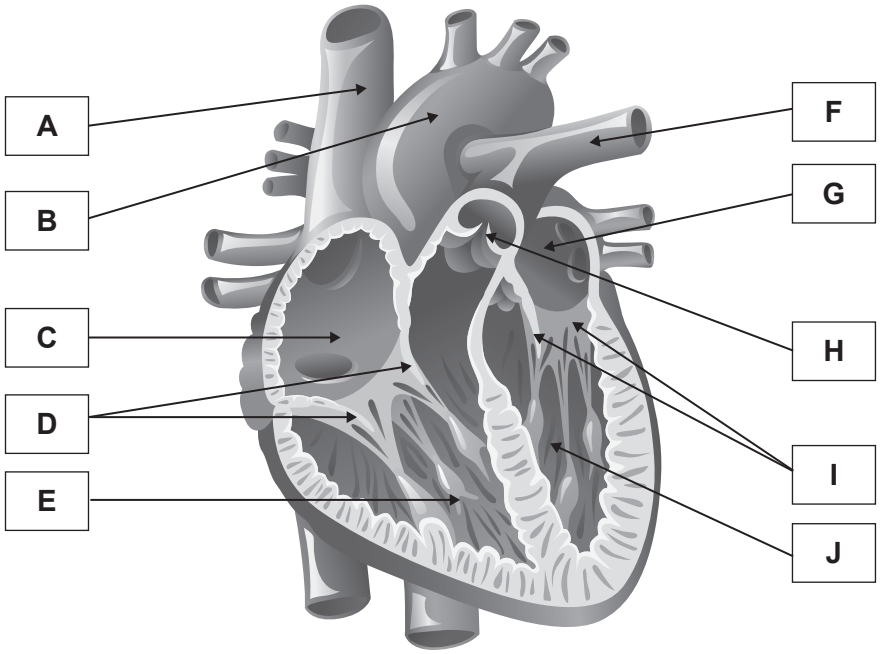
Slow oxidative muscle fibres are used in ..... intensity sporting activities.

These muscle fibres have ..... capillaries.

Their resistance to fatigue is ..... .

[3]

15 The image below shows a labelled diagram of the heart.



Identify the following structures of the heart by matching the letter to the structure:

Left atrium .....

Aorta .....

Vena cava .....

Tricuspid valve .....

Pulmonary valve .....

[5]

16

(a) Complete the table to compare the structure and function of arteries and veins.

The first answer has been completed for you.

Feature	Comparison
Lumen size	The size of the lumen in arteries is smaller than in veins.
Direction of blood flow	....
Speed of blood flow	....
Muscle wall diameter	....
Blood pressure	....

[4]

(b) Complete the following sentences to describe the vascular shunt mechanism.

The vascular shunt mechanism describes the redistribution of ..... around the body during exercise.

The vasomotor control centre within the brain sends signals causing blood vessels called ..... to change diameter.

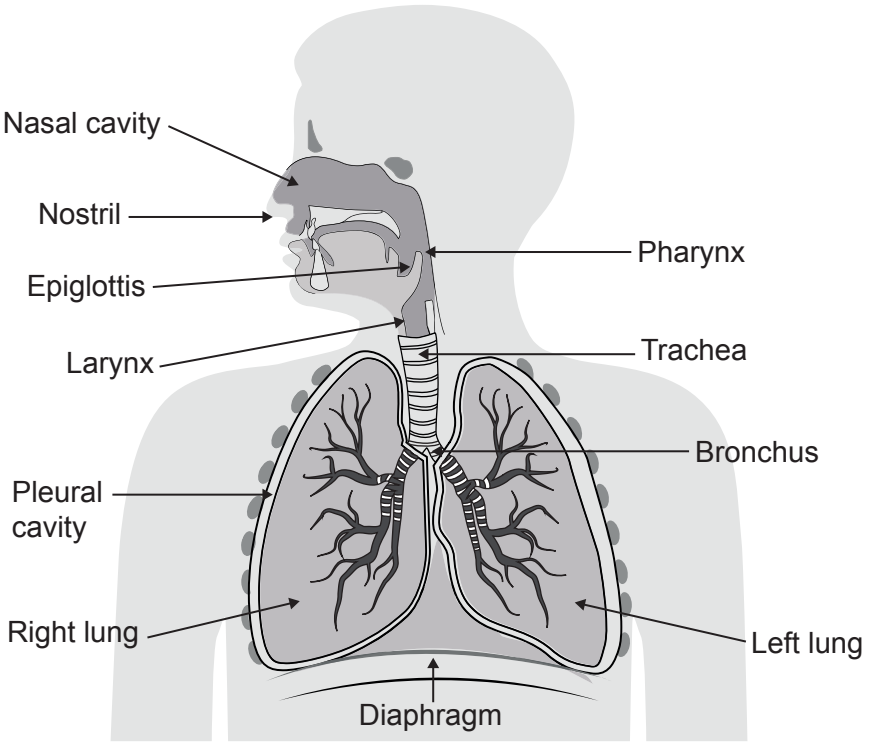
Narrowing of these blood vessels is called ..... .

Widening of these blood vessels is called ..... .

The diameter changes so that the ..... get more ..... .

[6]

17 The image below shows the structures of the respiratory system.



(a) Describe the roles of the following:

Epiglottis .....

.....

.....

Trachea .....

.....

.....

[2]

(b) Describe the role of the **diaphragm** in the mechanics of breathing during **inspiration**.

.....

.....

.....

..... **[2]**

18 State typical resting values, including units, for an untrained individual for:

Tidal volume .....

Breathing frequency .....

Minute ventilation .....

[3]

19 Describe the effects of a **cool down** on the **respiratory** system.

.....

.....

.....

.....

.....

.....

.....

..... **[3]**

20 Complete the table to describe the **aerobic** energy system.

Food fuels	..... and .....
Amount of ATP produced	.....
By-products	..... and .....

[5]

Section C

21* Explain the positive and negative effects of physical activity and sport on the muscular system.

Your answer should include:

- short-term effects during exercise
- long-term effects due to training.

[10]

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END OF QUESTION PAPER

EXTRA ANSWER SPACE

If you need extra space use these lined pages. You must write the question numbers clearly in the margin.