

Tuesday 10 January 2023 – 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
C400/2301



You can use:

- a calculator



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

Centre number

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Candidate number

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First name(s)

Last name

Date of birth

D	D	M	M	Y	Y	Y	Y
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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 **20** pages.

ADVICE

- Read each question carefully before you start your answer.

Section A

Answer **all** the questions.

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

1 Which one of the following is the type of synovial joint at the neck?

(a) Ball and socket

(b) Condylloid

(c) Fused

(d) Pivot

[1]

2 Which one of the following statements is correct?

(a) Diaphragm contracts during expiration

(b) Pectoralis minor muscles contract during inspiration

(c) Ribs contract during inspiration

(d) Scalene muscles contract during expiration

[1]

3 How many ATP molecules does the lactic acid system produce from the breakdown of **one** glucose molecule?

(a) 1

(b) 2

(c) 32

(d) 38

[1]

4 Which one of the following is a long-term effect of exercise on the skeletal system?

(a) Capillarisation

(b) Cardiac hypertrophy

(c) Osteoporosis

(d) Thicker cartilage at joints

[1]

5 Which one of the following muscles does **not** cause movement of the vertebral column?

(a) Erector spinae

(b) External obliques

(c) Pronator teres

(d) Rectus abdominus

[1]

6 Which one of the following correctly describes **two** short-term effects of exercise on the cardiovascular system?

(a) Decreased cardiac output and increased stroke volume

(b) Decreased cardiac output and decreased stroke volume

(c) Increased cardiac output and decreased stroke volume

(d) Increased cardiac output and increased stroke volume

[1]

7 Which one of the following muscles contracts to cause hip flexion?

(a) Adductor longus

(b) Gluteus maximus

(c) Iliopsoas

(d) Supinator

[1]

8 Which one of the following does **not** assist gaseous exchange at the alveoli?

(a) High glycogen content

(b) Moist walls of alveoli

(c) Steep diffusion gradient

(d) Vast capillary network

[1]

9 State the approximate timescale for full recovery of the ATP-PC/lactic system.

..... [1]

10 Calculate the stroke volume of an individual with a cardiac output of 5600 ml/minute and a heart rate of 70 bpm.

.....

..... [1]

Section B

Answer **all** the questions.

11 Fig. 11 shows a diagram of the skeleton.

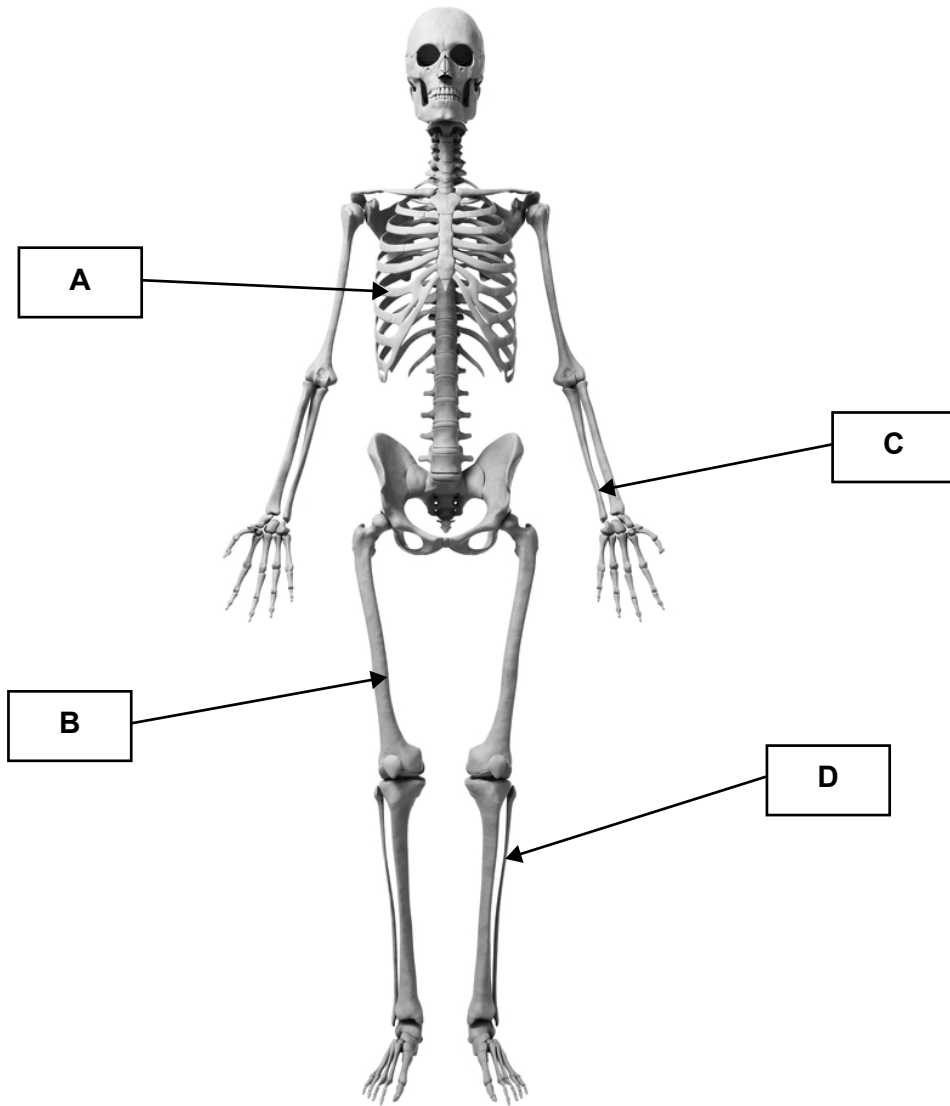


Fig. 11

(a) Identify the bones labelled **A**, **B**, **C** and **D**.

- A
- B
- C
- D

[4]

(b) Other than protection and mineral storage, state **three** functions of the skeleton.

1

2

3

[3]

12 Fig. 12 shows the structures at a synovial joint.

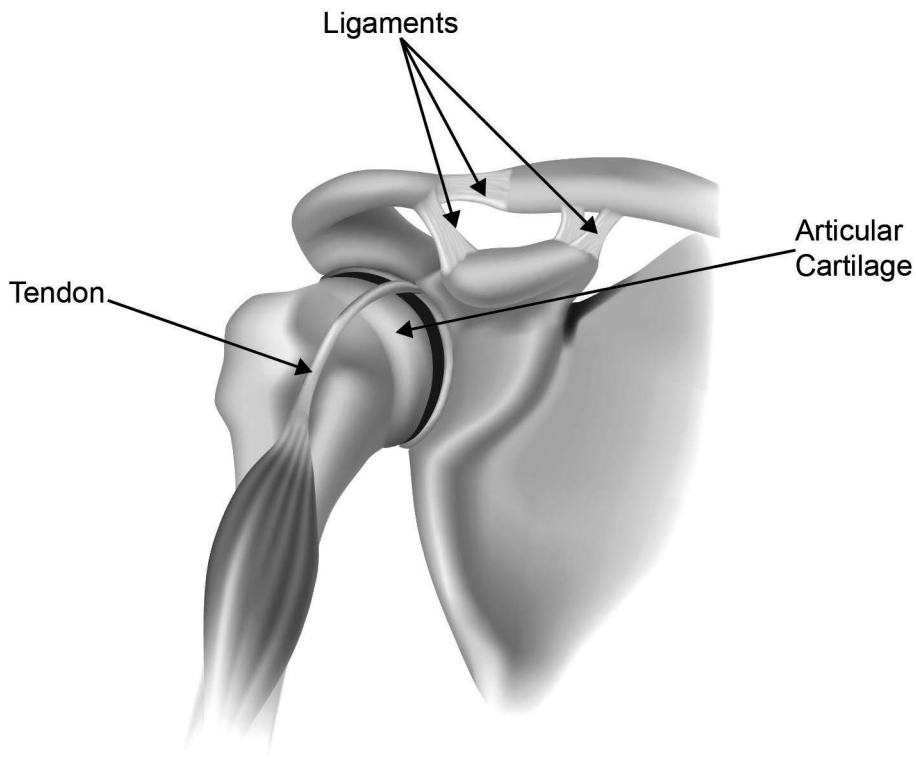


Fig. 12

Describe the function of each of the following structures at a synovial joint:

Articular cartilage

.....
.....
.....

Ligaments

.....
.....
.....

[2]

13 Fig. 13 shows a footballer kicking a ball.



Fig. 13

(a) Explain how the muscles acting on the knee joint in the kicking leg work as agonist and antagonist when the ball is kicked.

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..... **[4]**

(b) Name **one** fixator muscle that stabilises the ankle joint as the ball is kicked.
Identify the type of contraction produced by this fixator.

Fixator

Type of contraction

[2]

(c) Explain how a warm up can increase the speed and force of muscle contractions.

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..... [3]

14 Fig. 14 shows the performance of a vertical jump.

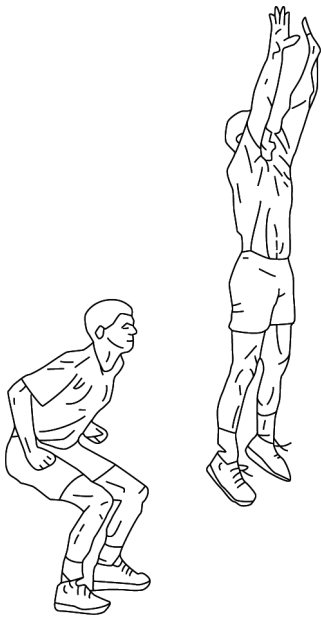


Fig. 14

Complete the table to identify the type of synovial joint and joint movement at the shoulders and knees as the performer jumps into the air.

Joint	Type of synovial joint	Joint movement
Knee
Shoulder

[4]

15 The following statements describe the structure and function of fast oxidative fibres.

Complete the statements by selecting words from the box below:

capillary	force	contract	phosphocreatine
relaxation	fatigue	high	low

Fast oxidative muscle fibres are able to powerfully.

However, they have a limited ability to resist

These fibres have a anaerobic capacity.

They also have a higher density than fast glycolytic fibres.

[4]

16 Blood passes through various structures in the heart.

Identify the chamber of the heart that blood enters **after** passing through each of the **three** structures listed here:

Vena cava

Pulmonary vein

Bicuspid valve

[3]

17 Using **Fig. 17** sketch a line graph showing the heart rate response of a performer jogging at a steady pace on a treadmill for 20 minutes.

The graph should show heart rate before exercise starts, during exercise and during recovery.

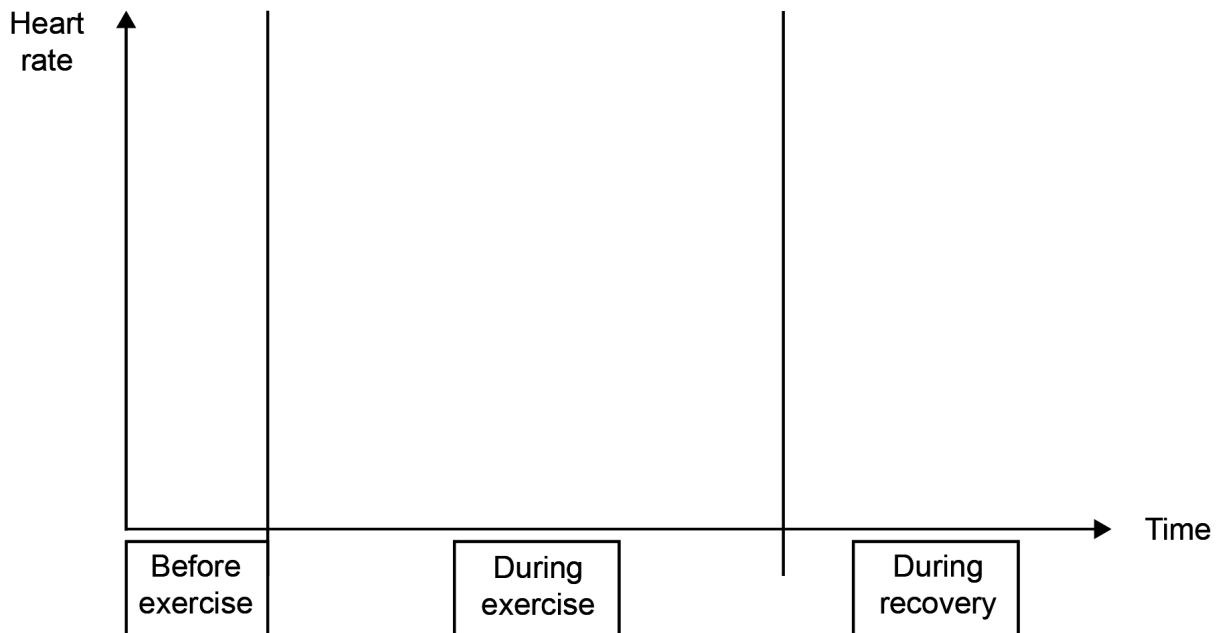


Fig. 17

[4]

18 (a) Explain the role of pre-capillary sphincters in the circulatory system during exercise.

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..... [3]

(b) Complete **Table 18** to show the components and functions of blood.

Component	Function
Red blood cells	<p>.....</p> <p>.....</p> <p>.....</p>
<p>.....</p> <p>.....</p>	<p>Help fight infections by attacking bacteria, viruses, and germs that invade the body.</p>
<p>.....</p> <p>.....</p>	<p>Help the body to form clots to stop bleeding.</p>
Plasma	<p>.....</p> <p>.....</p> <p>.....</p>

Table 18

[4]

19 Fig. 19 shows key structures of the respiratory system.

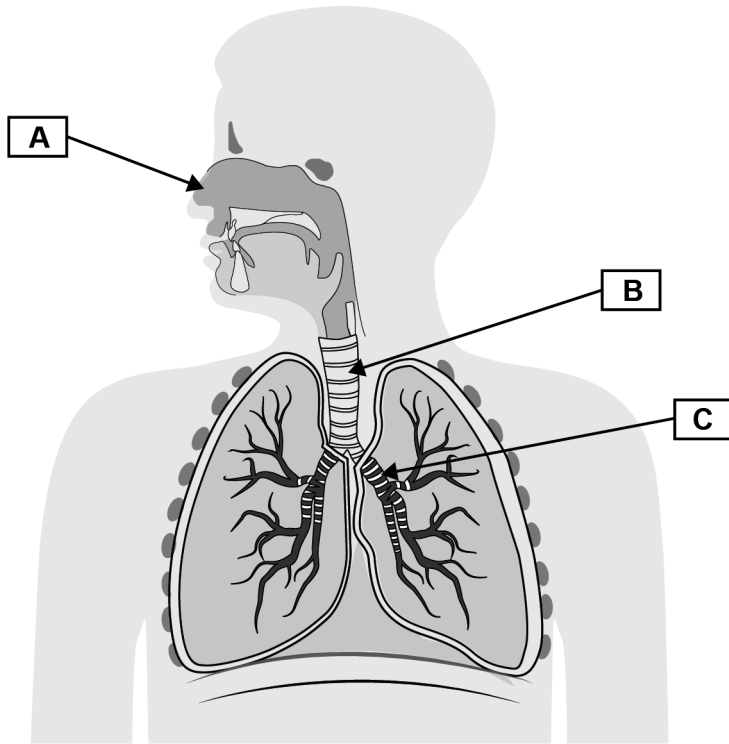


Fig. 19

(a) Identify the structures labelled **A**, **B** and **C**.

A

B

C

[3]

(b) Describe the roles of **A** and **C**.

A

.....

.....

C

.....

.....

[2]

20 The following statements describe the aerobic energy system.

Complete the statements by filling in the missing words.

The aerobic system follows three stages: aerobic glycolysis,

the

and the electron transport chain.

The type of reaction is aerobic because sufficient is present.

The food fuels for the aerobic system are and

.....

The by-products of the aerobic system are and water (H₂O).

[5]

Section C

21* Define the following respiratory terms:

- tidal volume
- breathing frequency
- minute ventilation.

Give typical resting values for each term for untrained individuals and trained athletes.

Suggest why the values for untrained individuals may be different to trained athletes at rest and during high intensity exercise.

[10]

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END OF QUESTION PAPER

ADDITIONAL ANSWER SPACE

If additional answer space is required, you should use the following lined pages. The question numbers must be clearly shown in the margins – for example, 13(a) or 18(a).

A vertical line on the left side of the page is followed by 25 horizontal dotted lines, providing a ruled area for writing answers.

A series of horizontal dotted lines for writing, spanning the width of the page.

A series of horizontal dotted lines for writing, spanning the width of the page.

A series of horizontal dotted lines for writing, spanning the width of the page.



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