

Tuesday 17 May 2022 – Morning

AS Level Physical Education

H155/01 Physiological factors affecting performance

Time allowed: 1 hour 15 minutes



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

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 extended response 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

Answer **all** the questions.

- 1 (a) Fig. 1.1 shows a performer stretching their right leg.



Fig. 1.1

Complete the table to analyse the movement at the right ankle joint as it moves in the direction of the arrow.

Joint	Movement	Agonist muscle	Type of contraction	Plane of movement	Fixator muscle
Right Ankle					

[5]

(b) Fig. 1.2 is a graph showing the changes in heart rate and stroke volume for a performer from rest to maximal exercise and during a period of recovery.

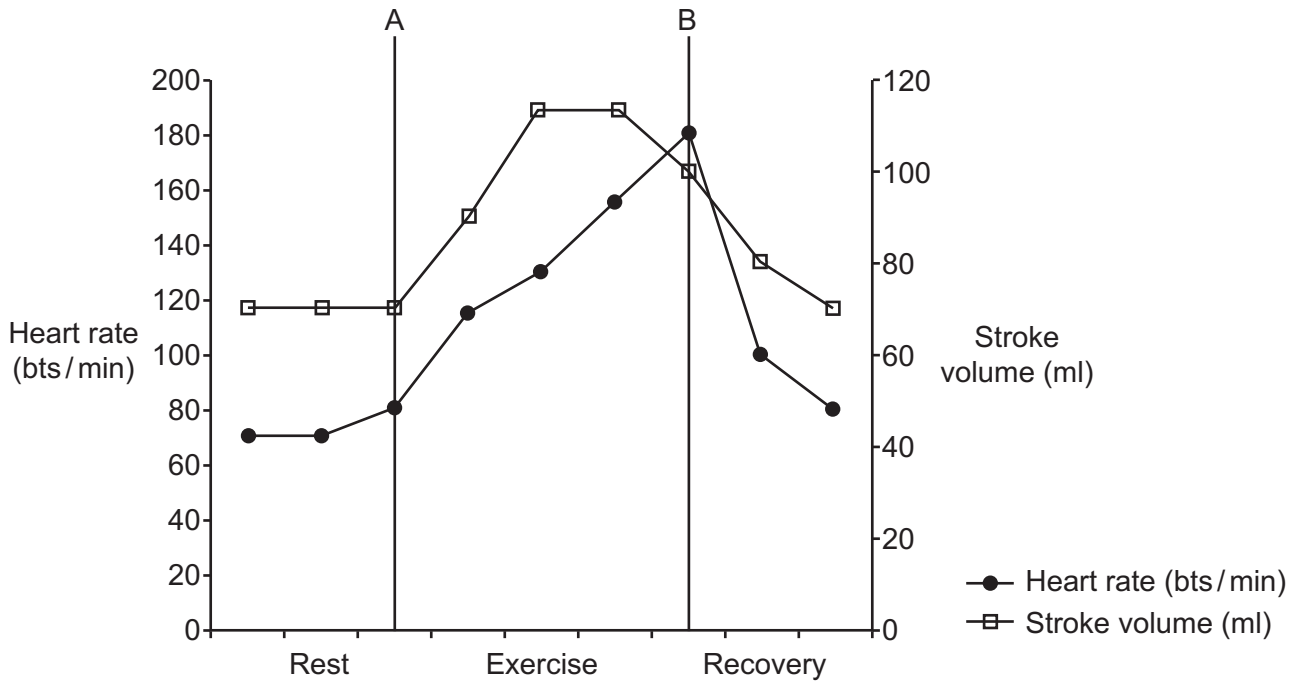


Fig. 1.2

Heart rate and stroke volume are used to calculate cardiac output.

Use the data in Fig. 1.2 to calculate the cardiac output at point A and at point B, shown by the vertical lines.

What is the increase in cardiac output between points A and B?
Show your workings.

Cardiac output at point A

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.....

.....

Cardiac output at point B

.....

.....

.....

Increase in cardiac output between points A and B

..... [5]

(c) Venous return is the movement of blood from the veins to the right atrium of the heart.

(i) Two mechanisms that aid venous return are the muscle pump and the respiratory pump. Describe these **two** venous return mechanisms.

Muscle pump:
.....
.....

Respiratory pump:
.....
.....

[2]

(ii) Explain how the muscle and respiratory pumps cause changes to venous return during exercise and during recovery.

Exercise:
.....
.....

Recovery:
.....
.....

[2]

(iii) Outline why completing a cool down after exercise aids venous return.

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

(d) (i) Define the terms breathing frequency and tidal volume and give a resting value for each.

Breathing frequency:

.....

Resting value:

Tidal volume:

.....

Resting value:

[4]

(ii) The muscles that contract during breathing at rest are:

Put a tick (✓) in the box next to the correct answer.

A Diaphragm and external intercostal muscles

B Diaphragm and internal intercostal muscles

C External intercostal and internal intercostal muscles

D External intercostal and sternocleidomastoid muscles

[1]

- 3 (a) Fig. 3.1 is a diagram showing the stationary preparation phase, and the upward execution phase of a vertical jump.

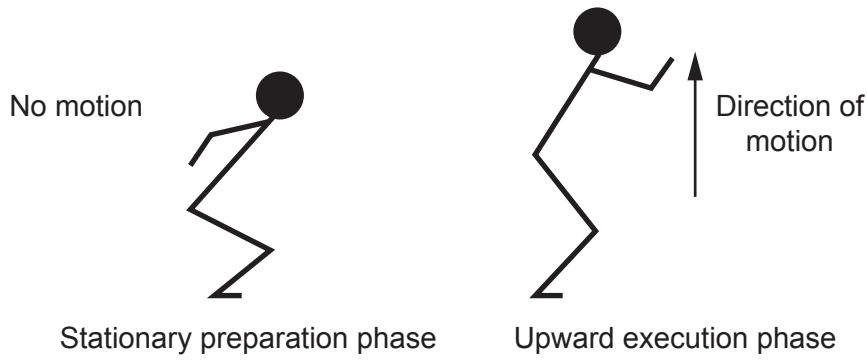


Fig. 3.1

Apply your knowledge of balanced and unbalanced forces to explain the motion in each phase of the vertical jump.

Stationary preparation phase

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Upward execution phase

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(c) Fig. 3.2 shows a diagram of a speed skater gliding in a straight line on an ice rink.

(i) Use Fig. 3.2 to draw the vertical and horizontal forces acting on the speed skater at this point in their skating action.

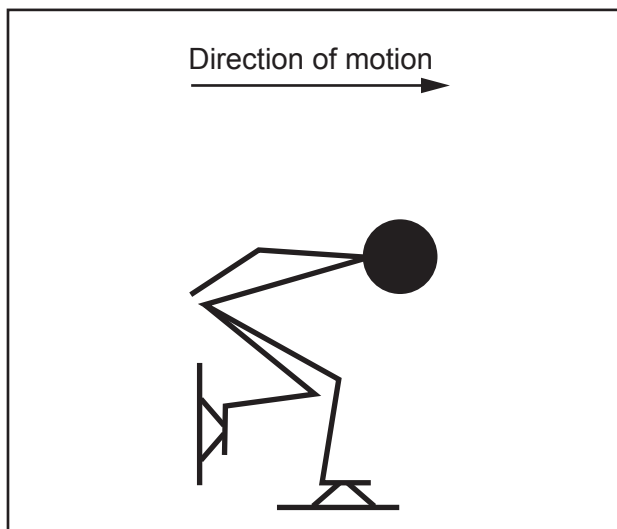


Fig. 3.2

[4]

(ii) Use your diagram to suggest why and how the speed skater reduces the size of the force acting between the surface of the skate and the ice.

Why:

.....

How:

.....

[2]

(d) Define the term centre of mass and use a practical example from sport to describe a factor that affects the position of the centre of mass.

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..... [3]

ADDITIONAL ANSWER SPACE

If additional space is required, you should use the following lined page(s). The question number(s) must be clearly shown in the margin(s).

A large area of lined paper for writing. It features a vertical solid line on the left side, creating a margin. The rest of the page is filled with horizontal dotted lines, providing space for writing answers.

A large area of the page is reserved for writing, featuring a vertical solid line on the left side and horizontal dotted lines extending across the page.



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