

OXFORD CAMBRIDGE AND RSA EXAMINATIONS

Friday 23 May 2025 – Morning

A Level Physical Education

H555/01 Physiological factors affecting performance

Time allowed: 2 hours

plus your additional time allowance

**YOU CAN USE:
a calculator**

Please write clearly in black ink.

Centre number

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Candidate number

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First name(s)

Last name

READ INSTRUCTIONS OVERLEAF



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 90.

The marks for each question are shown in brackets [].

Quality of extended response will be assessed in questions marked with an asterisk (*).

ADVICE

Read each question carefully before you start your answer.

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SECTION A

1

- (a) Which of the following are BOTH muscles that contract to cause movement at the ankle?

Put a tick (✓) in the box next to the ONE correct answer. [1]

A Gastrocnemius and adductor longus

☐

B Semitendinosus and soleus

☐

C Soleus and tibialis anterior

☐

D Teres minor and gastrocnemius

☐

- (b) Which of the following are BOTH muscles that contract to cause movement at the hip?

Put a tick (✓) in the box next to the ONE correct answer. [1]

A Adductor brevis and iliopsoas

☐

B Gluteus minimus and latissimus dorsi

☐

C Trapezius and gluteus maximus

☐

D Vastus intermedius and pectoralis major

☐

2 The cardiac cycle involves systole and diastole.

Describe systole.

[2]

3

(a) Explain the term excess post-exercise oxygen consumption (EPOC) in the recovery process.

[1]

(b) State the effect of exercise intensity on EPOC.

[1]

- 4 One example of a sports injury is torn cartilage, which may be treated using PRICE and will require further medical attention.

Identify TWO OTHER appropriate treatments for torn cartilage.

1 _____

2 _____

[2]

5 The following statements describe Bernoulli's principle.

Complete the statements by using words below:

air resistance

equal

flight

friction

higher

lower

According to Bernoulli's principle, faster moving fluids have _____ pressure which might create a lift force.

A downwards lift force causes an increase in _____. [2]

SECTION B

6

- (a) Functional characteristics of muscle fibre types include the speed and force of contraction, aerobic and anaerobic capacity, and fatigue resistance.**

Evaluate the functional characteristics of slow oxidative muscle fibres for a hockey player. [5]

[illegible]

(b) Explain how intrinsic factors regulate heart rate at the start of exercise.

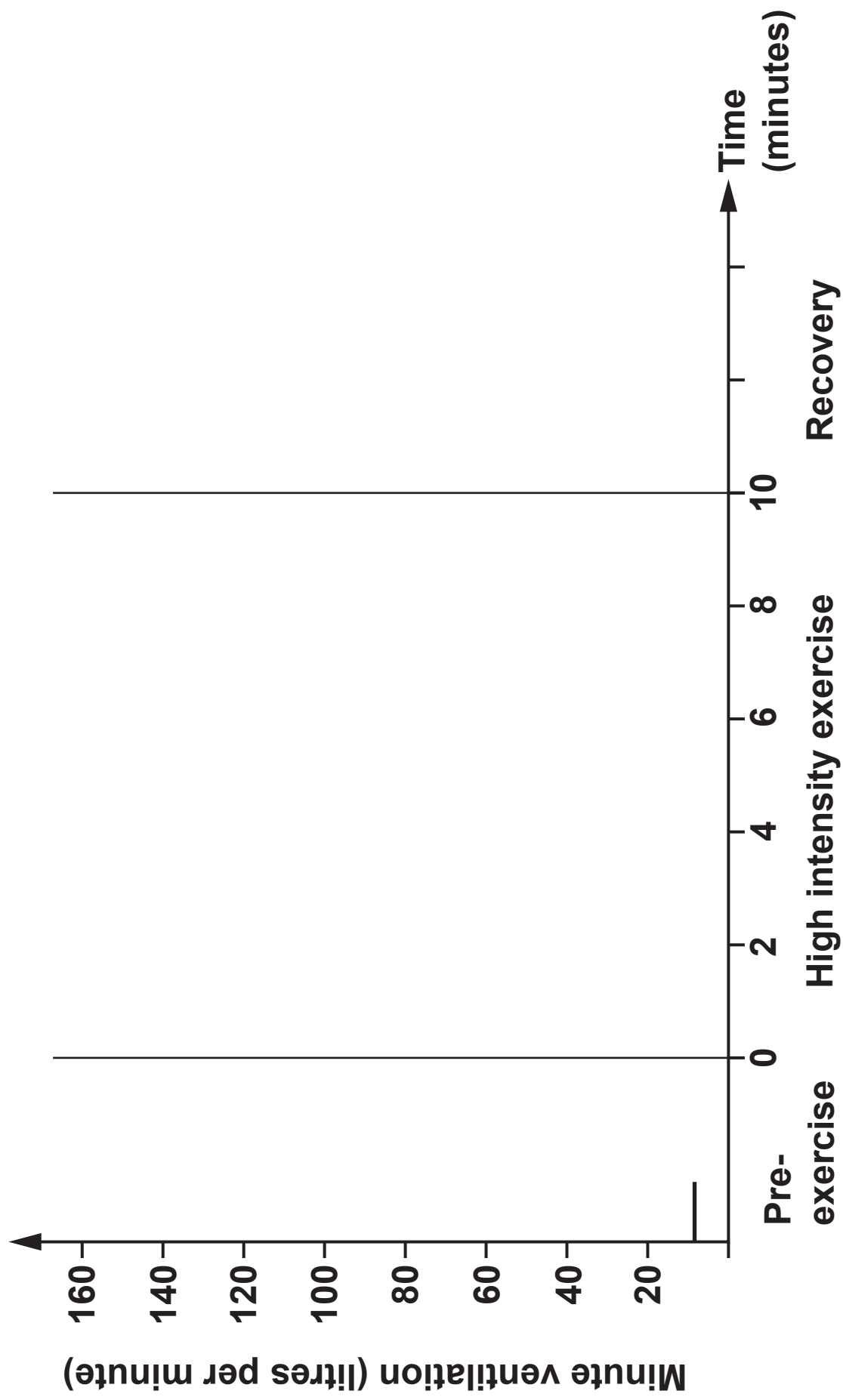
[4]

(c)

- (i) Complete the **THREE** missing parts of the table to describe the respiratory system for a typical adult at rest. [3]

Key term	Definition	Resting value
Frequency	The number of inspirations or expirations in one minute	
Tidal volume		

- (ii) Sketch a line graph on the graph opposite to show the effect of pre-exercise, high intensity exercise and recovery on the minute ventilation of a performer. The start of the line is on the graph to show minute ventilation at rest. [3]



[illegible]

7

- (a) Explain ONE benefit and ONE risk of using each of the following nutritional aids:

Creatine

Benefit _____

Risk _____

Nitrate

Benefit _____

Risk _____

[4]

(b)

(i) Describe the use of the Queen's College step test as a method of evaluating aerobic capacity.

[4]

(ii) Describe how a goniometer is used to measure knee flexibility.

[2]

(c)

(i) Describe the lifestyle disease known as atherosclerosis.

[2]

(ii) Outline THREE effects of regular training which might reduce the risk of atherosclerosis.

1

2

3

[3]

[illegible]

8

- (a) Describe the use of limb kinematics to optimise the performance of a javelin throw.**

[3]

(b)

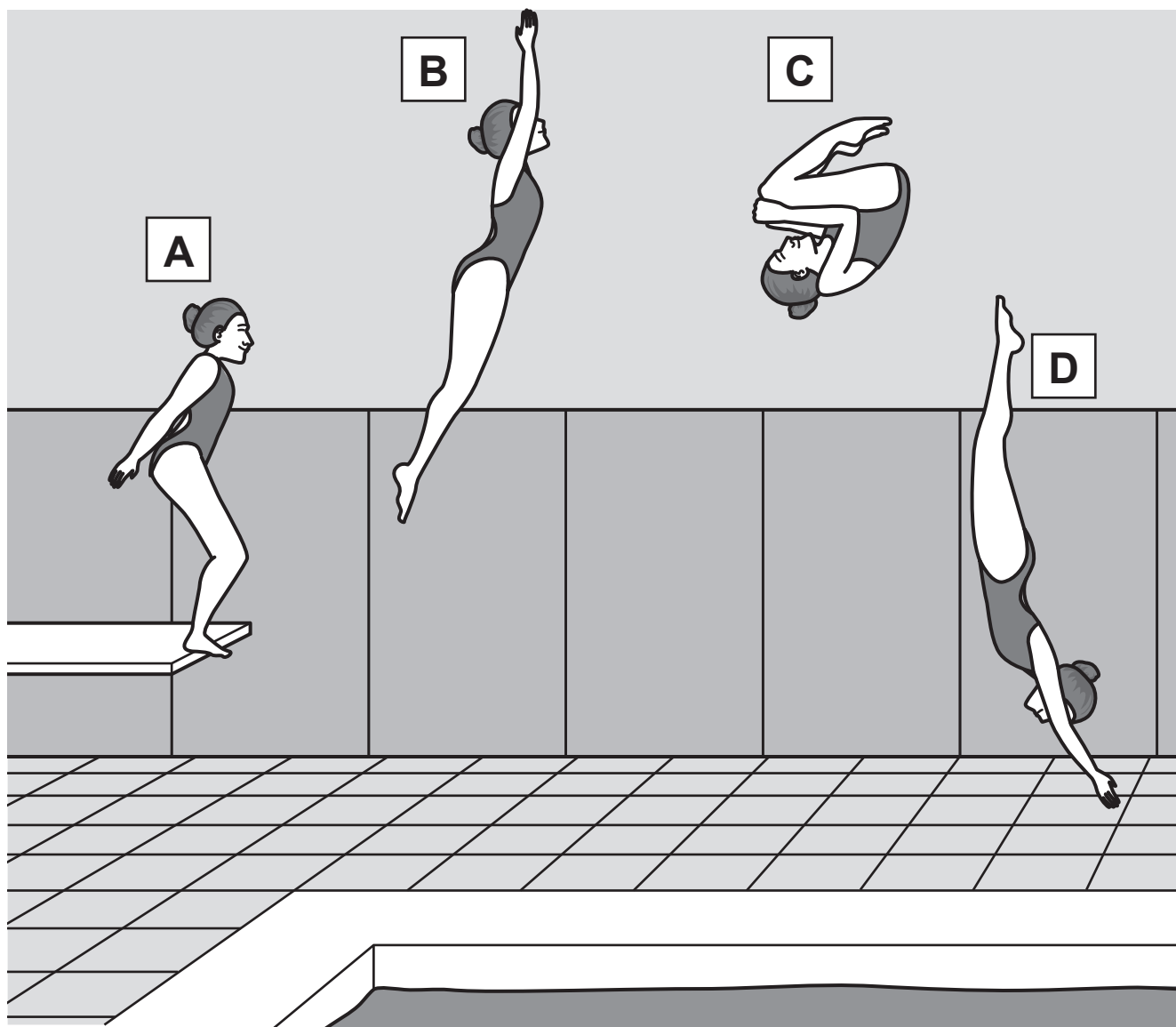
- (i) Define angular momentum.**

State the formula used to calculate angular momentum.

Definition _____

Formula _____
[2]

(ii) The image shows the performance of a forward somersault dive.



Apply knowledge of conservation of angular momentum to explain how the diver performs this forward somersault dive. [5]

(c) State the force acting against the movement of a body through water.

Explain how FOUR different factors affect the size of this force.

Force _____

Factors

1 _____

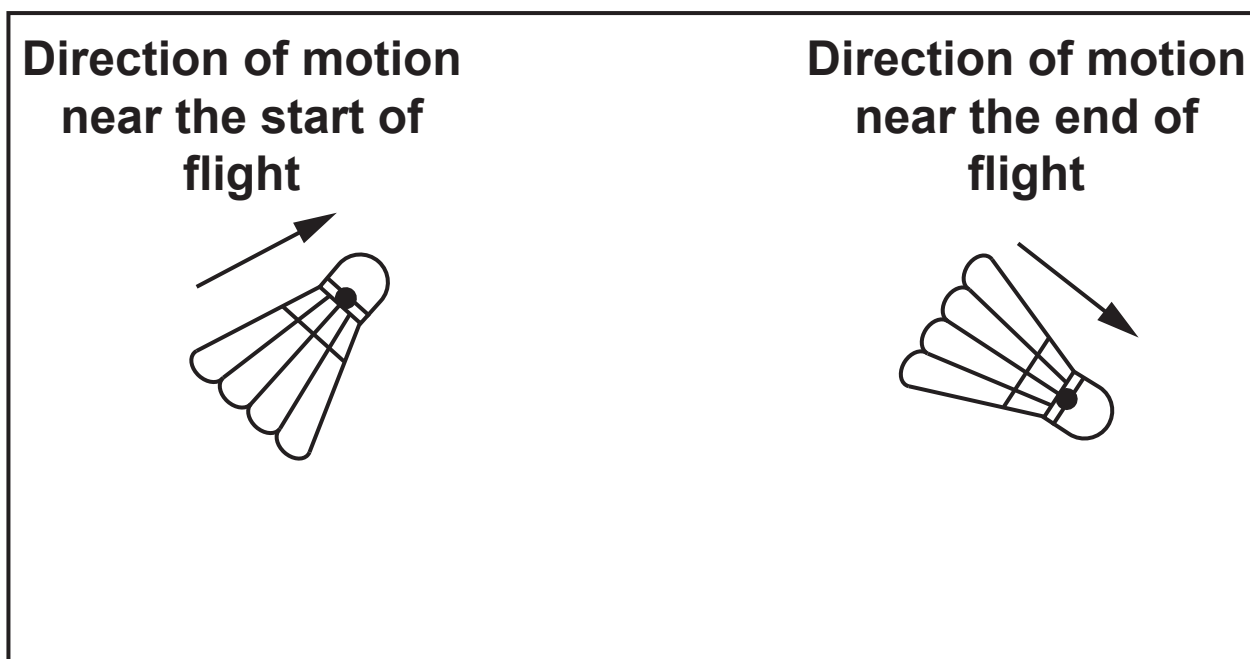
2 _____

3 _____

4 _____

[5]

- (d) The images show a hard-hit shuttlecock near the start and end of its flight.
The centre of mass of the shuttlecock is marked with a dot.



- (i) On each image draw a free body diagram to show the relative sizes of the forces of weight and air resistance acting on the shuttlecock at each stage of its flight. [2]

(ii) Explain why the shape of the flight path of the shuttlecock is non-parabolic.

[3]

SECTION C

- 9* Define Newton's laws of motion and apply them to a sprinter in athletics.**

Describe plyometrics strength training for a sprinter.

Analyse the physiological adaptations from plyometric strength training that would benefit a sprinter.

Your answer should be limited to:

Muscle and connective tissue adaptations

Neural adaptations

Metabolic adaptations [20]

[illegible]

[illegible]

[illegible]

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.

[illegible]

[illegible]

[illegible]

[illegible]



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