

## 8: Mechanics 2 – Topic questions

## Paper 3

The questions in this document have been compiled from a number of past papers, as indicated in the table below.

Use these questions to formatively assess your learners' understanding of this topic.

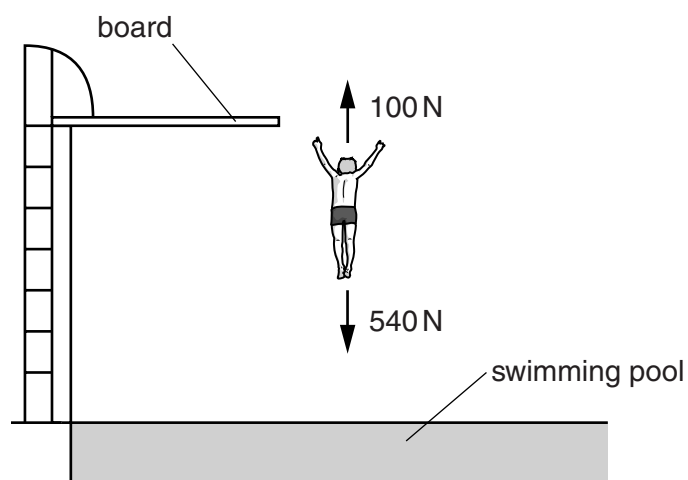
Question	Year	Series	Paper number
2	2016	June	31
5	2016	June	31
3	2016	March	32

The mark scheme for each question is provided at the end of the document.

You can find the complete question papers and the complete mark schemes (with additional notes where available) on the School Support Hub at [www.cambridgeinternational.org/support](http://www.cambridgeinternational.org/support)

- 2 A boy steps off a high board into a swimming pool.

Fig. 2.1 shows the forces acting on the boy at one point in his fall.



**Fig. 2.1**

- (a)** The 540 N force is caused by gravitational attraction.

State the cause of the 100 N force.

.....[1]

- (b)** Calculate the mass of the boy.

mass of boy = ..... kg [2]

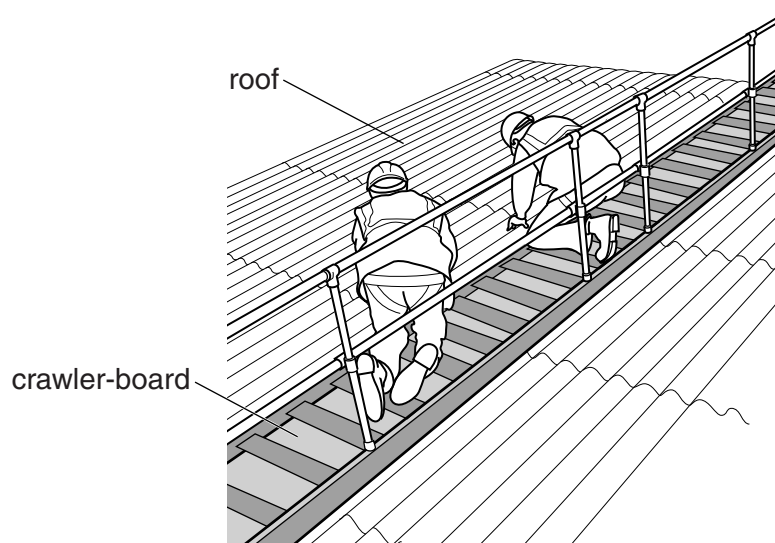
- (c)** Calculate the resultant force on the boy. State its direction.

resultant force = ..... N

direction = .....  
[2]

[Total: 5]

- 5 Fig. 5.1 shows two men repairing a weak roof using a crawler-board.



**Fig. 5.1**

- (a) Explain why use of the crawler-board prevents the men from falling through the roof.

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.....

.....[2]

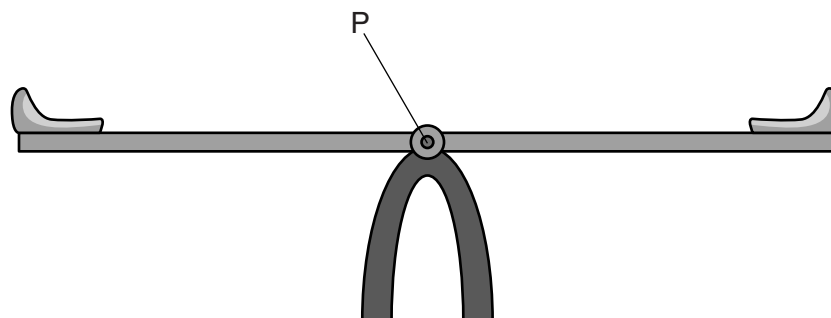
- (b) The crawler-board has a weight of 400 N. The total weight of the two men is 1600 N. The area of the crawler-board in contact with the roof is  $0.8 \text{ m}^2$ .

Calculate the pressure on the roof when the men are on the crawler-board. Include the unit.

pressure = .....[5]

[Total: 7]

- 3 Fig. 3.1 shows a see-saw. The see-saw is horizontal when not in use.



**Fig. 3.1**

A small child sits on one seat of the see-saw. This creates a turning effect about point P.

- (a) Which of these words means the turning effect of a force? Tick one box.

☐ equilibrium

☐ moment

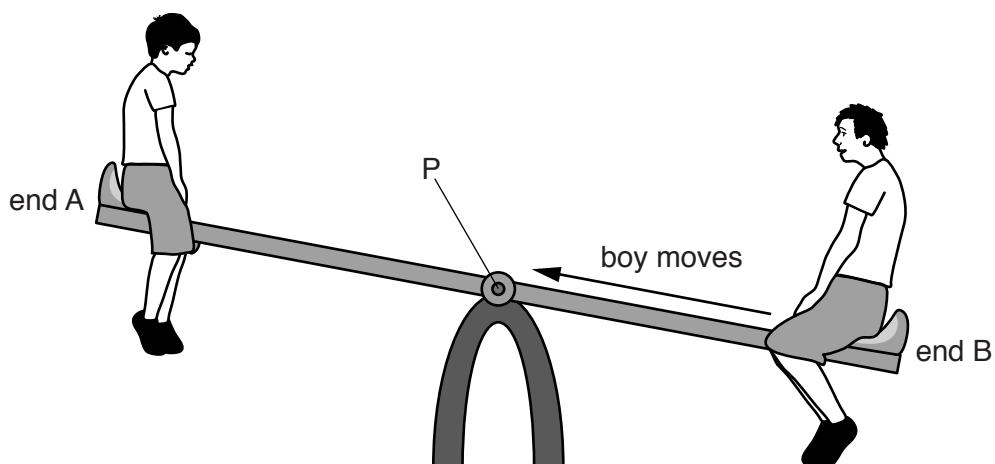
☐ resultant

[1]

- (b) State the scientific name for point P.

.....[1]

(c) A much heavier boy sits on the other end of the see-saw, as shown in Fig. 3.2.



**Fig. 3.2**

The heavier boy moves slowly along the see-saw from end B until he reaches point P.

Describe and explain what happens to the see-saw.

.....

.....

.....

.....

.....[4]

[Total: 6]

Question	Answer	Mark
2 (a)	air resistance	B1
2 (b)	$W = m \times g$ in any form 54 (kg)	B1 B1
2 (c)	$(540 - 100) = 440(\text{N})$ downwards	B1 B1
		Total: 5
5 (a)	<b>any two from:</b> larger area (in contact with roof) weight <b>OR</b> force spread out lower pressure (on roof)	B2
5 (b)	400 + 1600 seen OR 2000(N) $P = F / A$ stated 2000 / 0.8 2500 $\text{N} / \text{m}^2$ <b>OR</b> Pa	B1 C1 C1 A1 B1
		Total: 7
3 (a)	middle box ticked – moment	B1
3 (b)	pivot/fulcrum	B1
3 (c)	any four from: <ul style="list-style-type: none"> <li>• (heavier) boy has greater force / weight / moment</li> <li>• when (heavier) boy lifts feet initially tips clockwise</li> <li>• as boy moves his (clockwise) moment (about P) becomes less</li> <li>• as distance (of boy's weight) from the pivot decreases end B moves upward</li> <li>• see-saw level owtte (when) turning forces balanced / moments equal</li> <li>• then end A tips down as anticlockwise moment is greater</li> </ul>	B4
		Total: 6

Notes about the mark scheme are available separately.