OCR
Oxford Cambridge and RSA

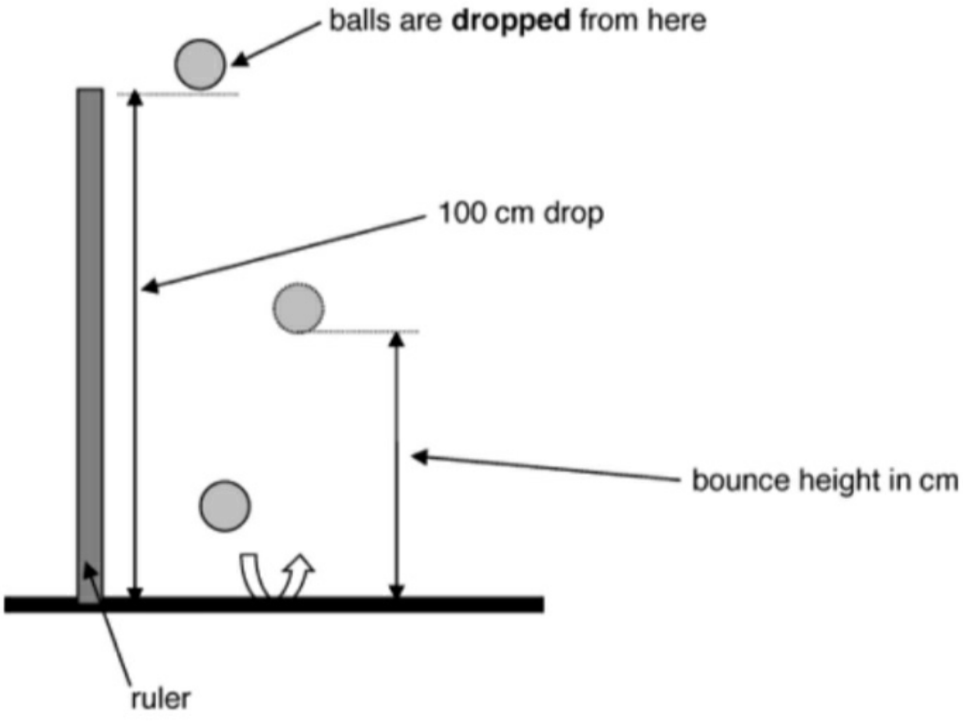
GCSE Physics A (Gateway)

J249/04 Physics A P5-P8 and P9 (Higher Tier)

Question Set 19

1 Student **A** investigates how well different balls bounce.

- She drops five different balls from the same height and measures the height the ball bounce.
- She repeats the experiment three times for each ball.



Her results are shown in **Table 1.1**.

Ball	Drop height (cm)	Bounce height (cm)			Mean bounce height (cm)
		1st reading	2nd reading	3rd reading	
Blue	100	61	62	60	61
Green	100	60	31	59	50
White	100	84	86	85	85
Yellow	100	26	24		26

Table 1.1

(a) Student **A** forgot to record one of the bounce heights for the **yellow** ball in **Table 1.1**.

Suggest the value of the **missing** result.

$26 = \frac{26 + 24 + x}{3}$

Answer = ... 28 ..... cm **[1]**

$78 = 50 + x$

$x = 28$

(b) Student **B** does an experiment with bouncing balls.

He does his experiment with a drop height of **200 cm**.
One ball bounces **100** cm.

Student **B** says that this ball is a better bouncer than any of Student **A**s balls.

Use **Table 19.1** and ideas about efficiency to explain why Student **B** is incorrect.

As Student B is dropping the ball at double the height ∴ it bounces higher. However that does not correlate with how bouncy the ball is. **[2]**

Student A

$\frac{61}{100} \times 100 = 61\%$ efficient

Student B

$\frac{100}{200} \times 100 = 50\%$ efficient

∴ student A's balls are more bouncy as it is more efficient (61% 750%) ∴ Student B is incorrect.

(c) Student **B** uses a new ball. He says this ball is an amazing bouncer.

He says if you drop it from **200** cm it will bounce to a height of **250** cm.

Explain why this is **not** possible.

As energy is not conserved (which it must) **[2]**
The energy put into a system is less than the energy after it bounces, which is not possible.

Bounce efficiency is $\frac{250}{200} \times 100 = 125\%$.

which is not possible as it is greater than 100%.

or

in

$mgh = 2mg$

out

2.5mg

$2mg < 2.5mg$.

Total Marks for Question Set 19: 5