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# HL Paper 1

The volume  $V$  of a cylinder of radius  $R$  and height  $H$  is given by  $V = \pi R^2 H$ . The volume of the cylinder was measured with an uncertainty of 10% and the height was measured with an uncertainty of 6%. What is the uncertainty in the radius of the cylinder?

- A. 1%
  - B. 2%
  - C. 4%
  - D. 8%
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Two lengths,  $a$  and  $b$ , are measured to be  $51 \pm 1$  cm and  $49 \pm 1$  cm respectively. In which of the following quantities is the percentage uncertainty the largest?

- A.  $a + b$
  - B.  $a - b$
  - C.  $a \times b$
  - D.  $\frac{a}{b}$
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What is a correct value for the charge on an electron?

- A.  $1.60 \times 10^{-12}$   $\mu\text{C}$
  - B.  $1.60 \times 10^{-15}$  mC
  - C.  $1.60 \times 10^{-22}$  kC
  - D.  $1.60 \times 10^{-24}$  MC
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A ball is thrown with velocity  $u$  at an angle of  $55^\circ$  above the horizontal. Which of the following is the magnitude of the horizontal component of velocity?

- A.  $u \cos 55^\circ$
  - B.  $u \sin 55^\circ$
  - C.  $u$
  - D.  $u \tan 55^\circ$
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Which of the following expresses the units of capacitance in terms of fundamental units?

A.  $s^4 A^2 m^{-2} kg^{-1}$

B.  $s^2 A m^{-2} kg^{-1}$

C.  $s^4 A^2 m^{-2}$

D.  $s^2 A m^{-2}$

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