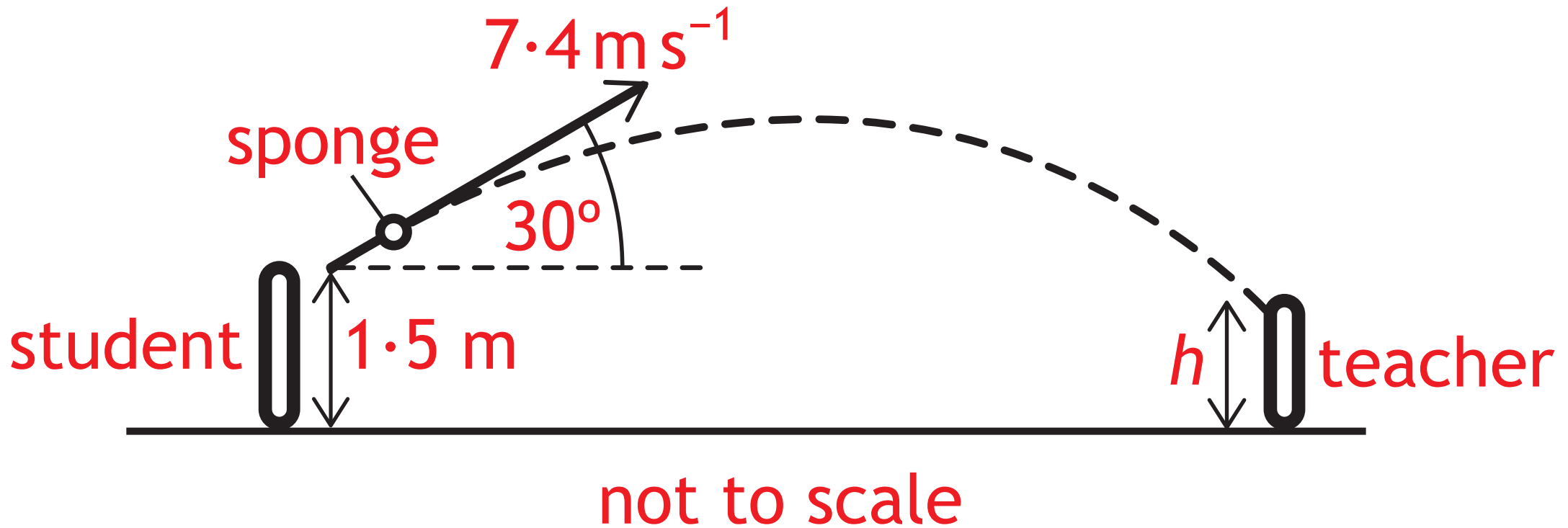
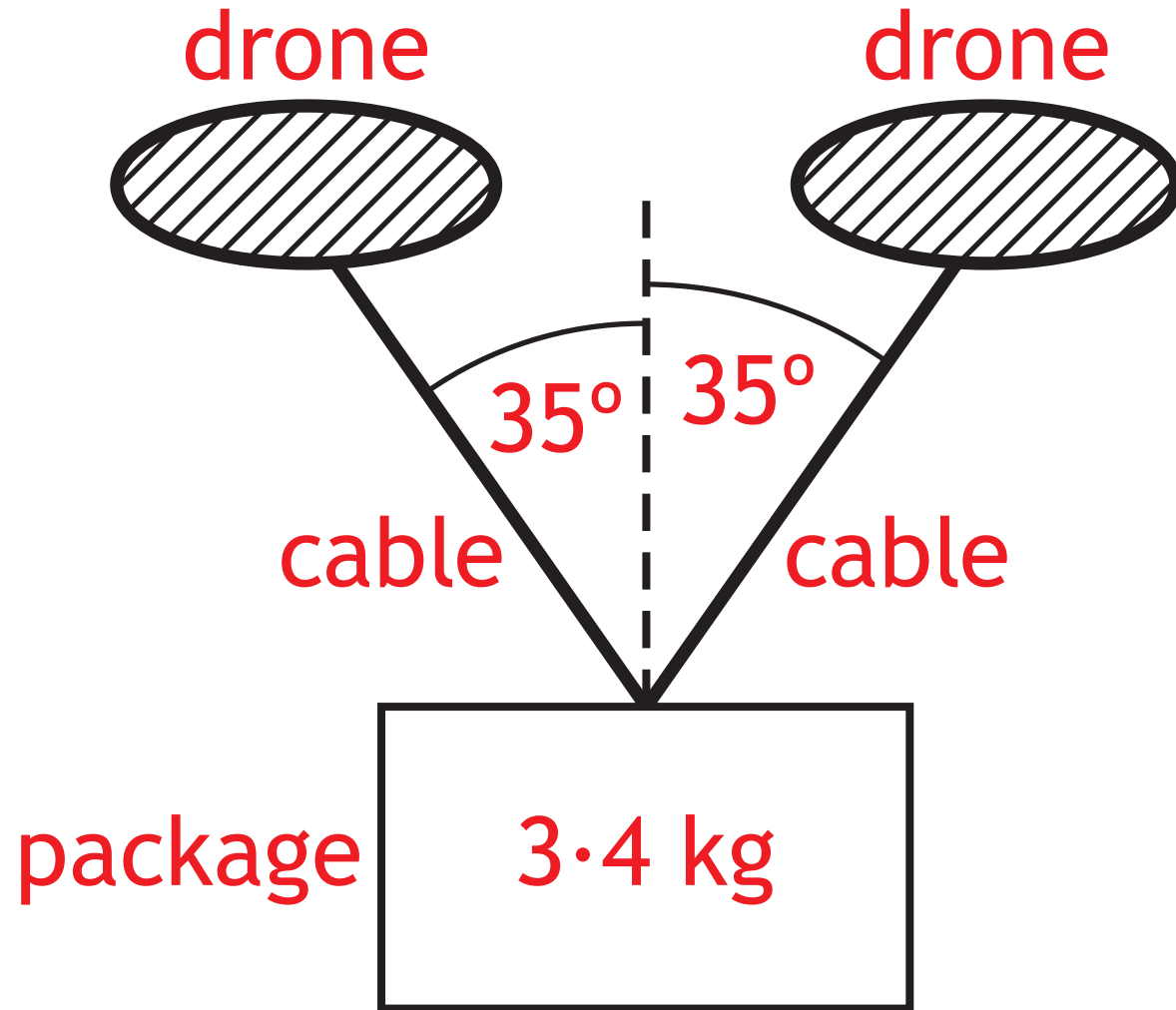


Q1



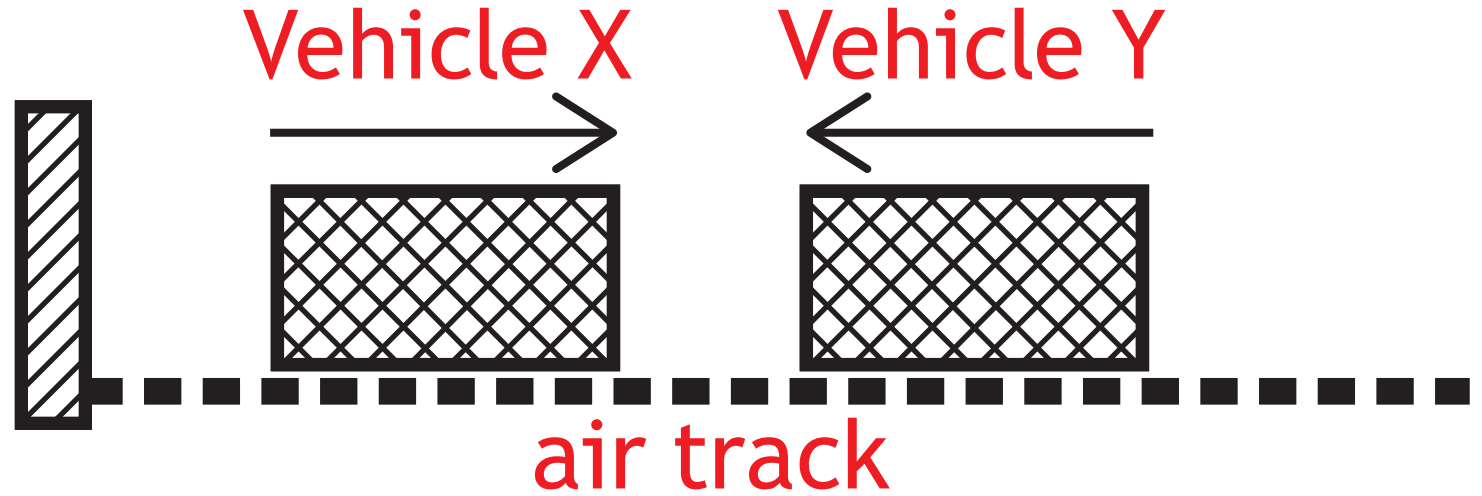
not to scale



not to scale

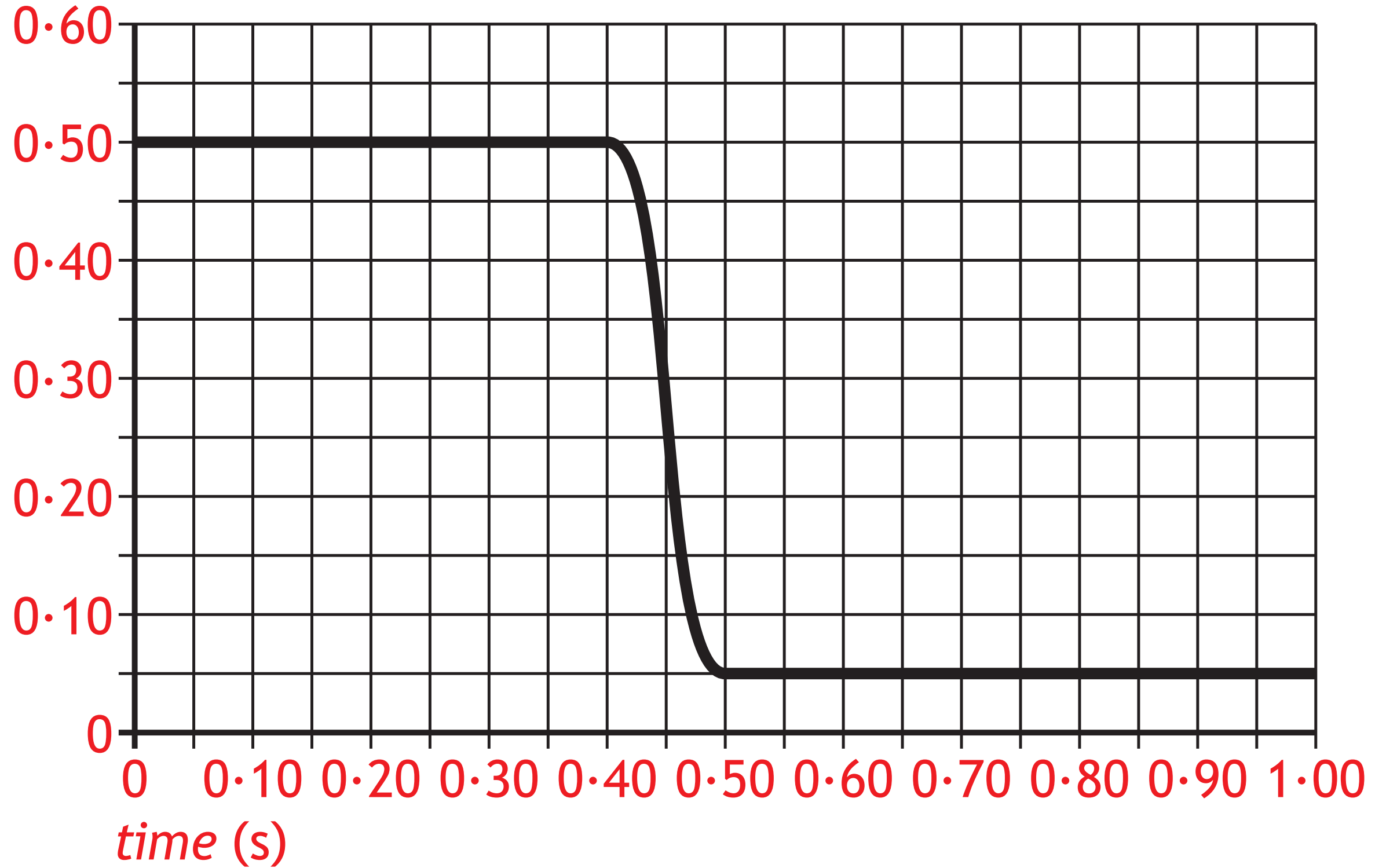
motion sensor  
connected  
to computer

Diagram 1



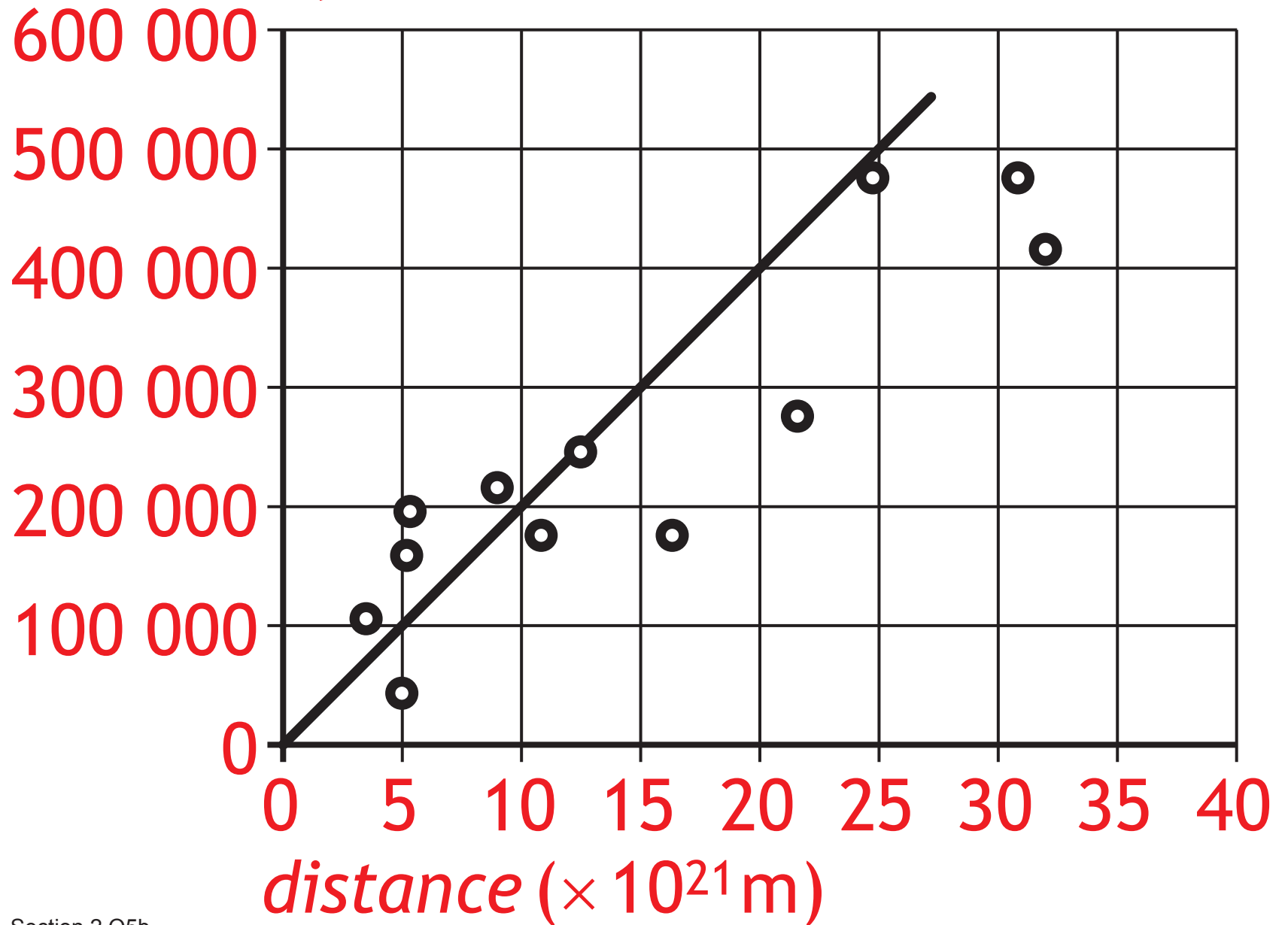
*velocity (m s<sup>-1</sup>)*

Diagram 2

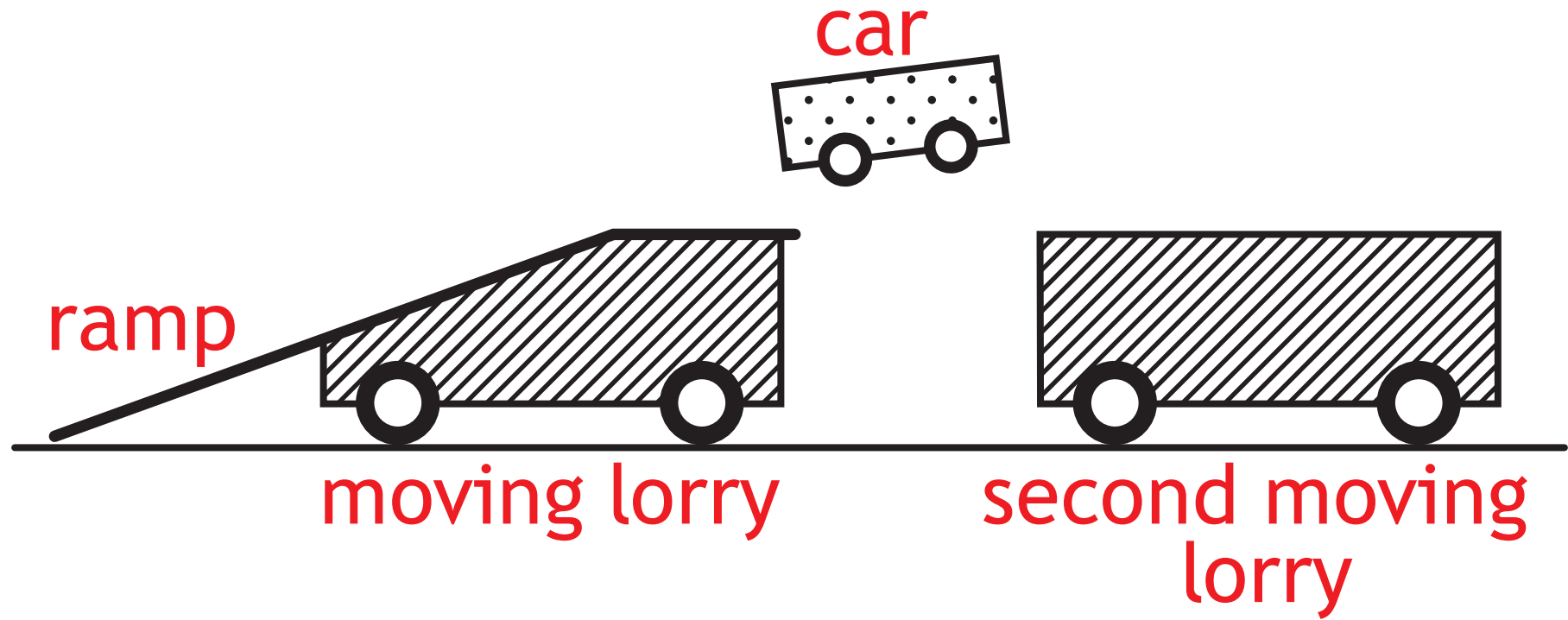


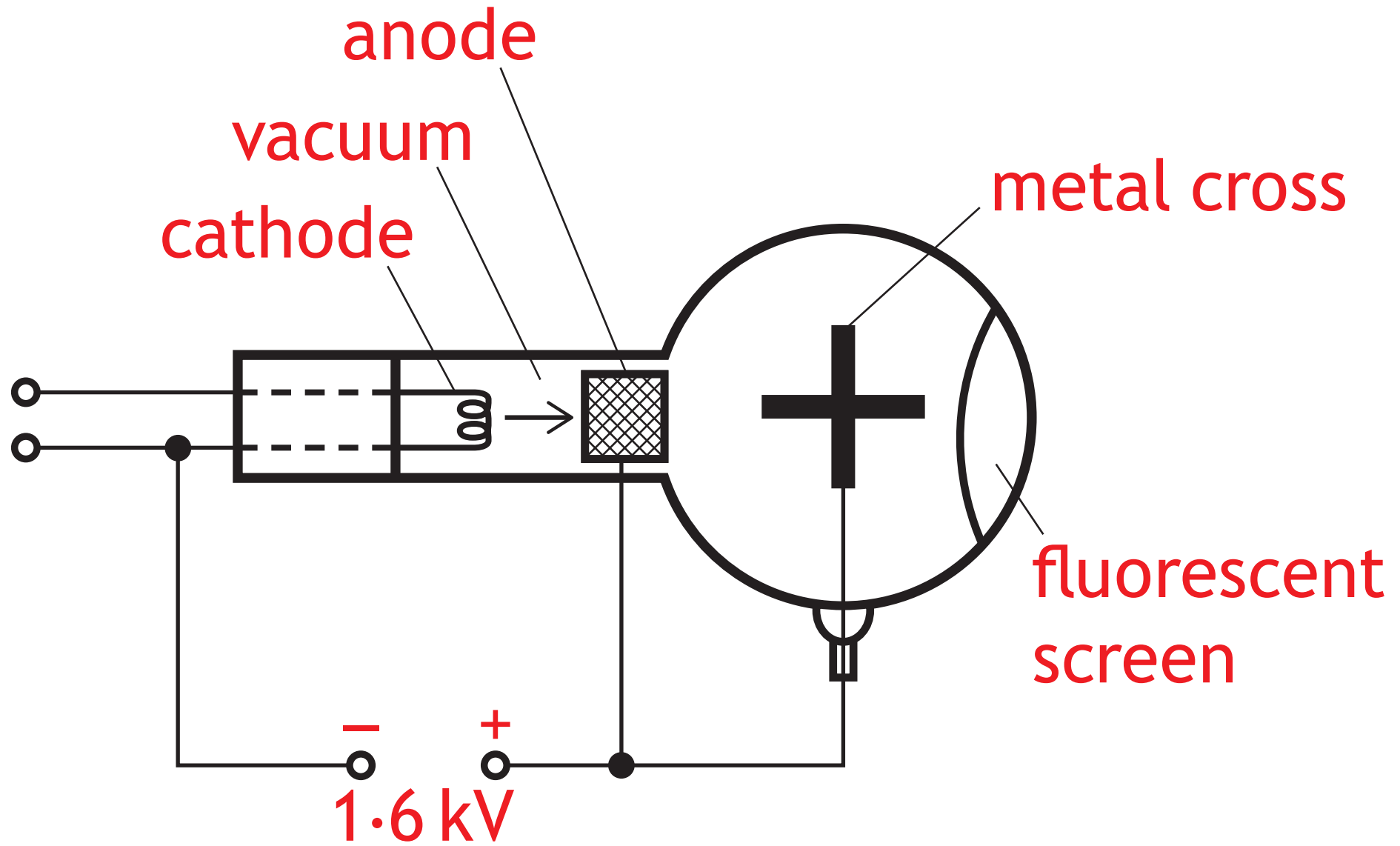
Q5b

*recessional velocity (m s<sup>-1</sup>)*

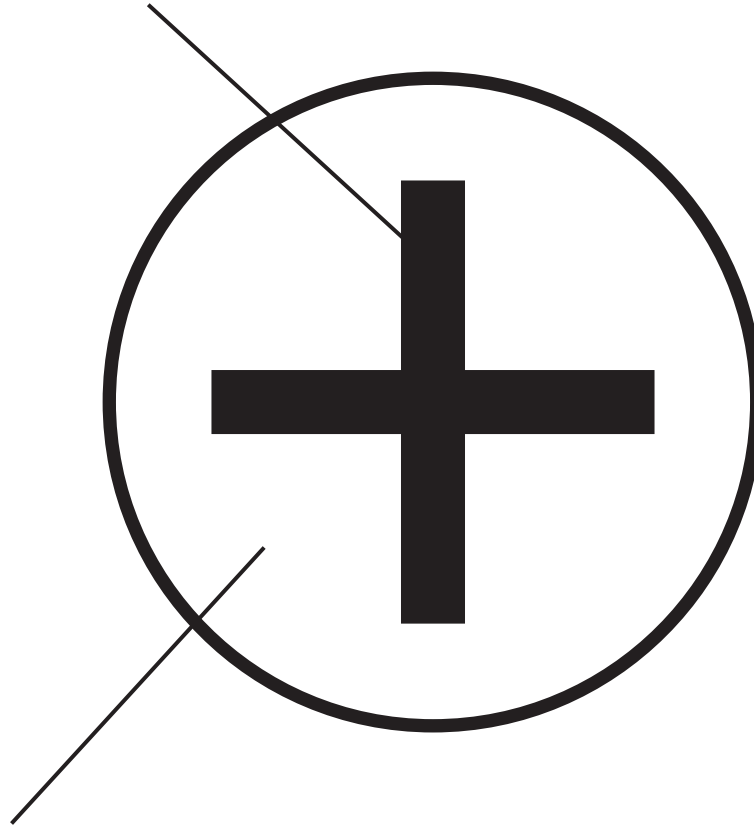


Q4





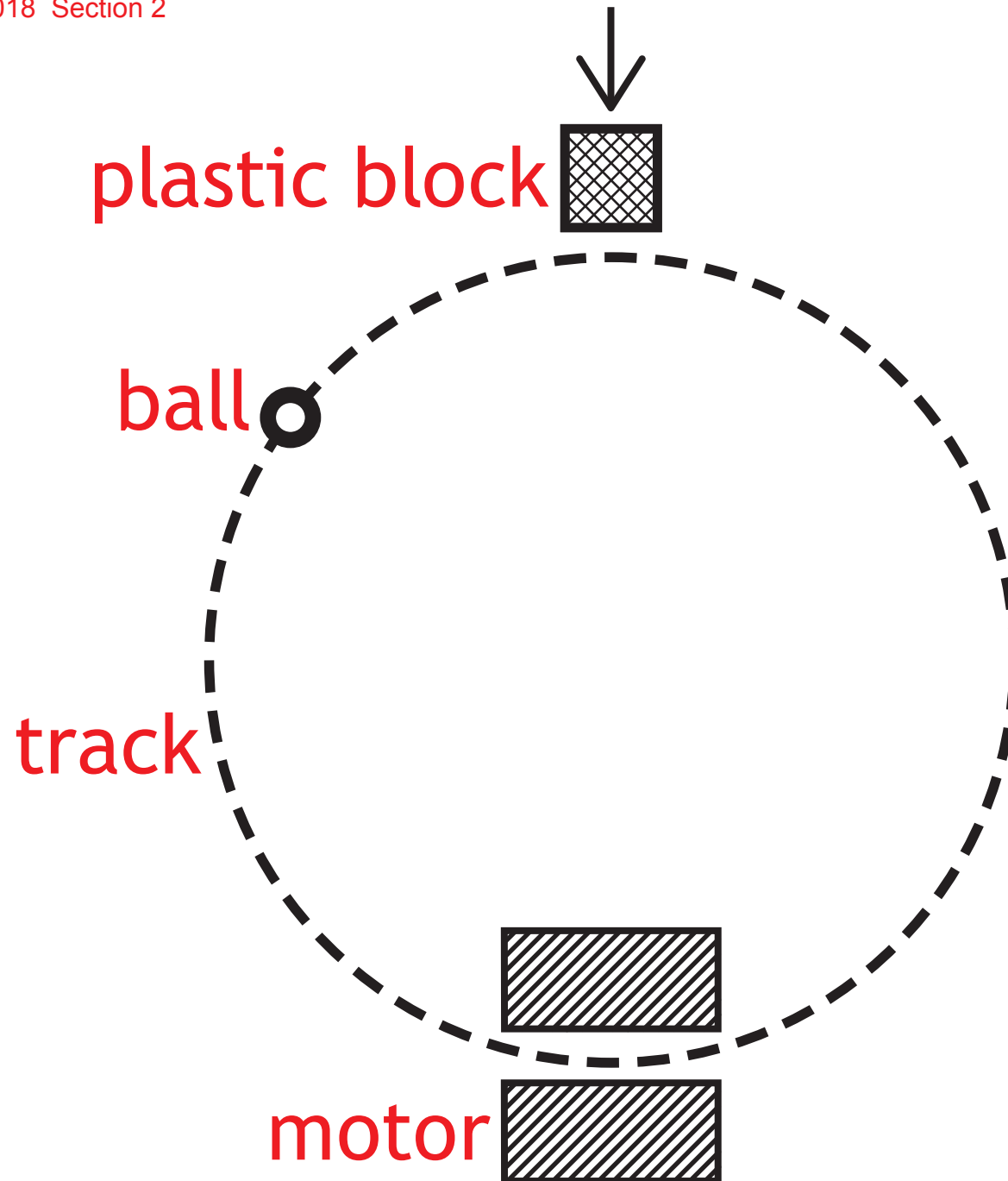
shadow of metal cross



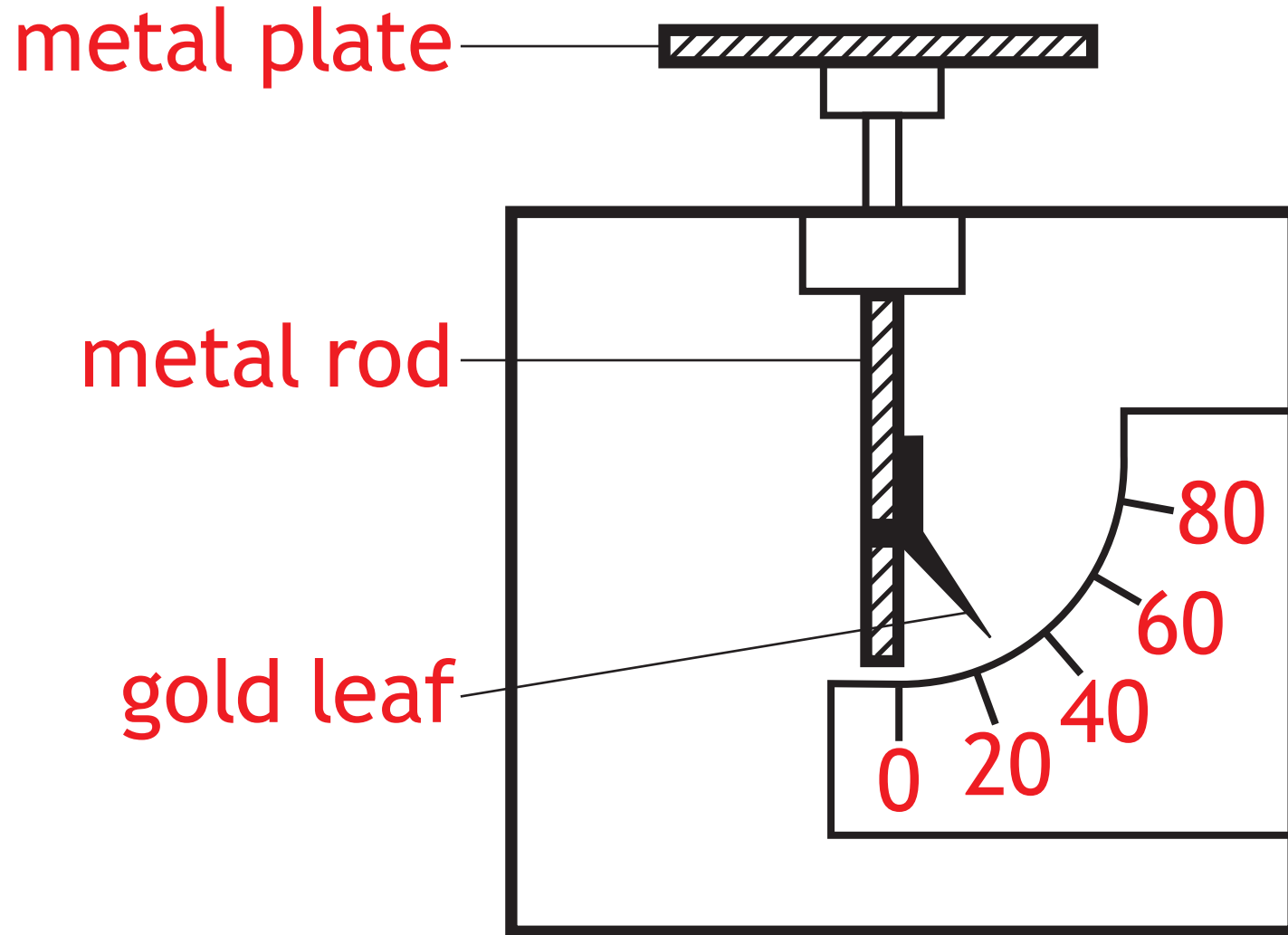
glowing fluorescent screen



Q6c

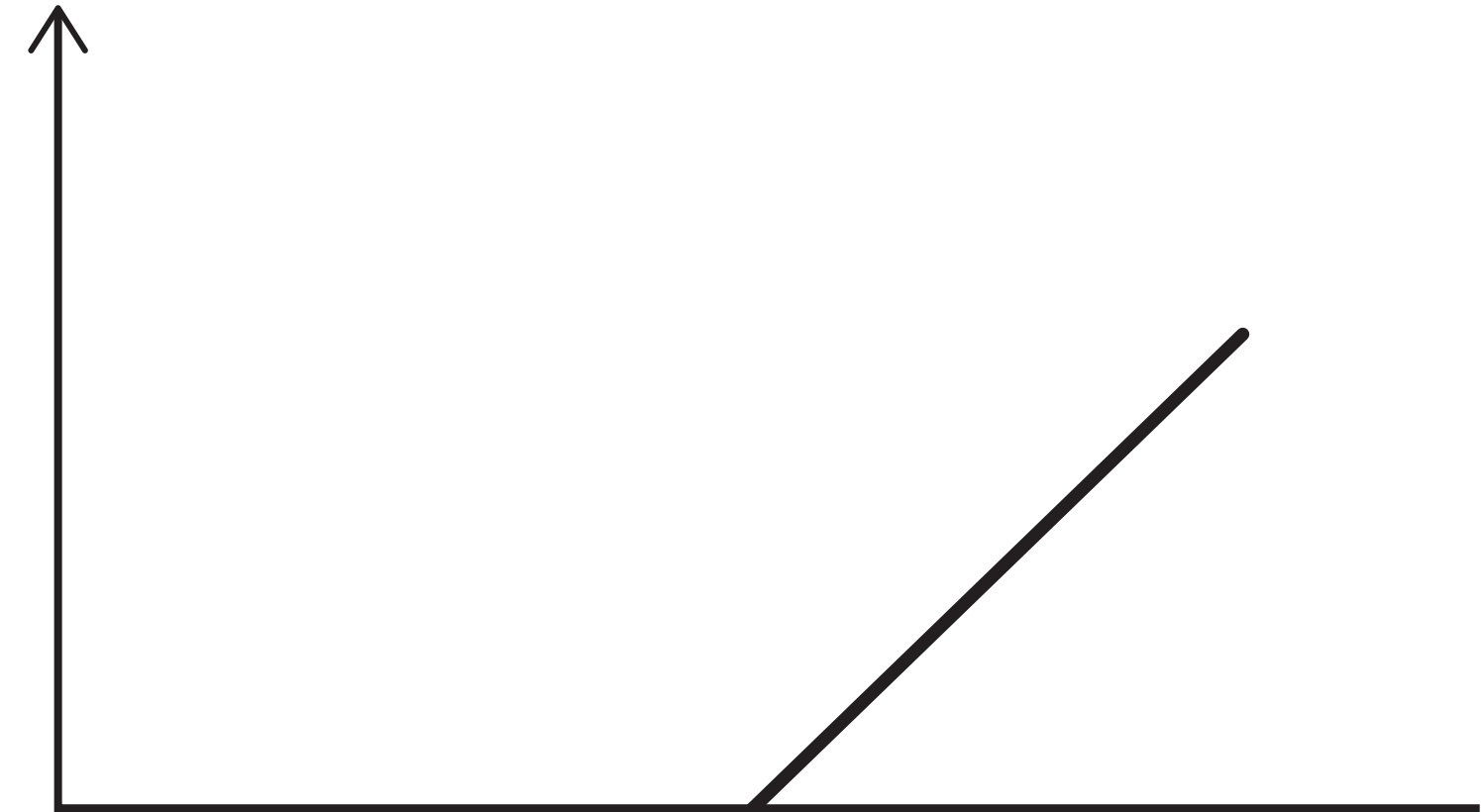


# gold-leaf electroscope



Q7c

*kinetic energy (J)*

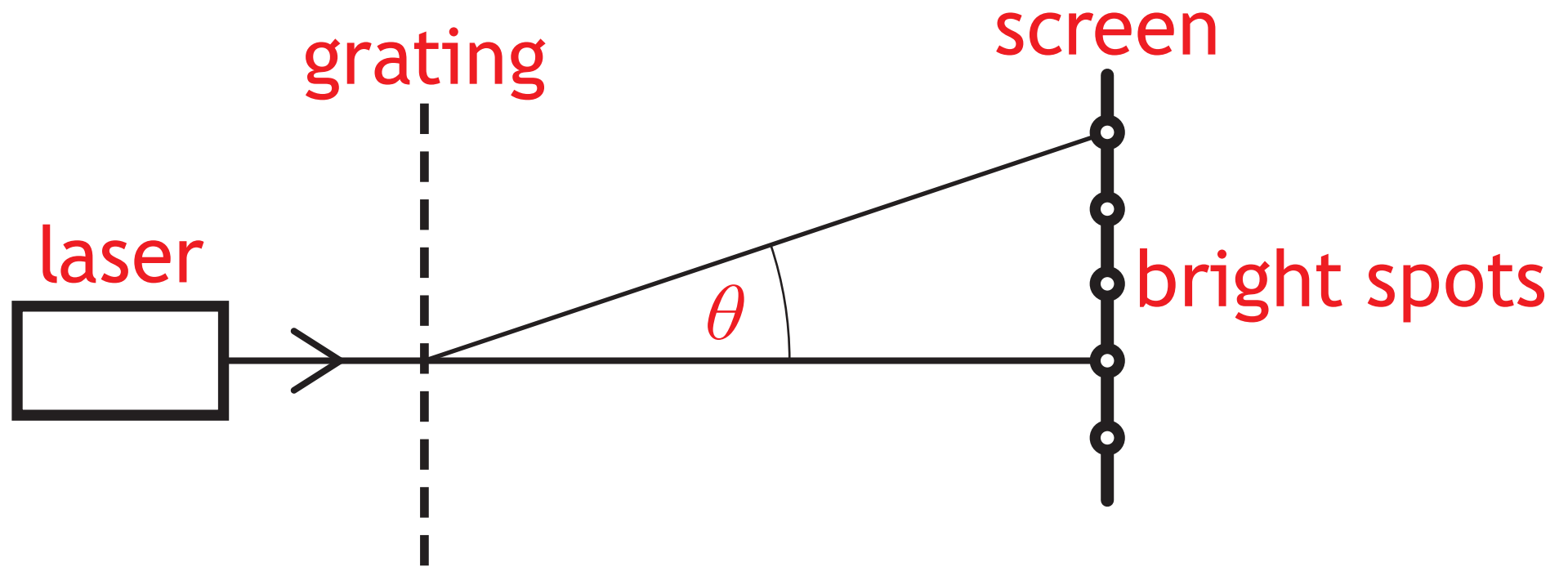


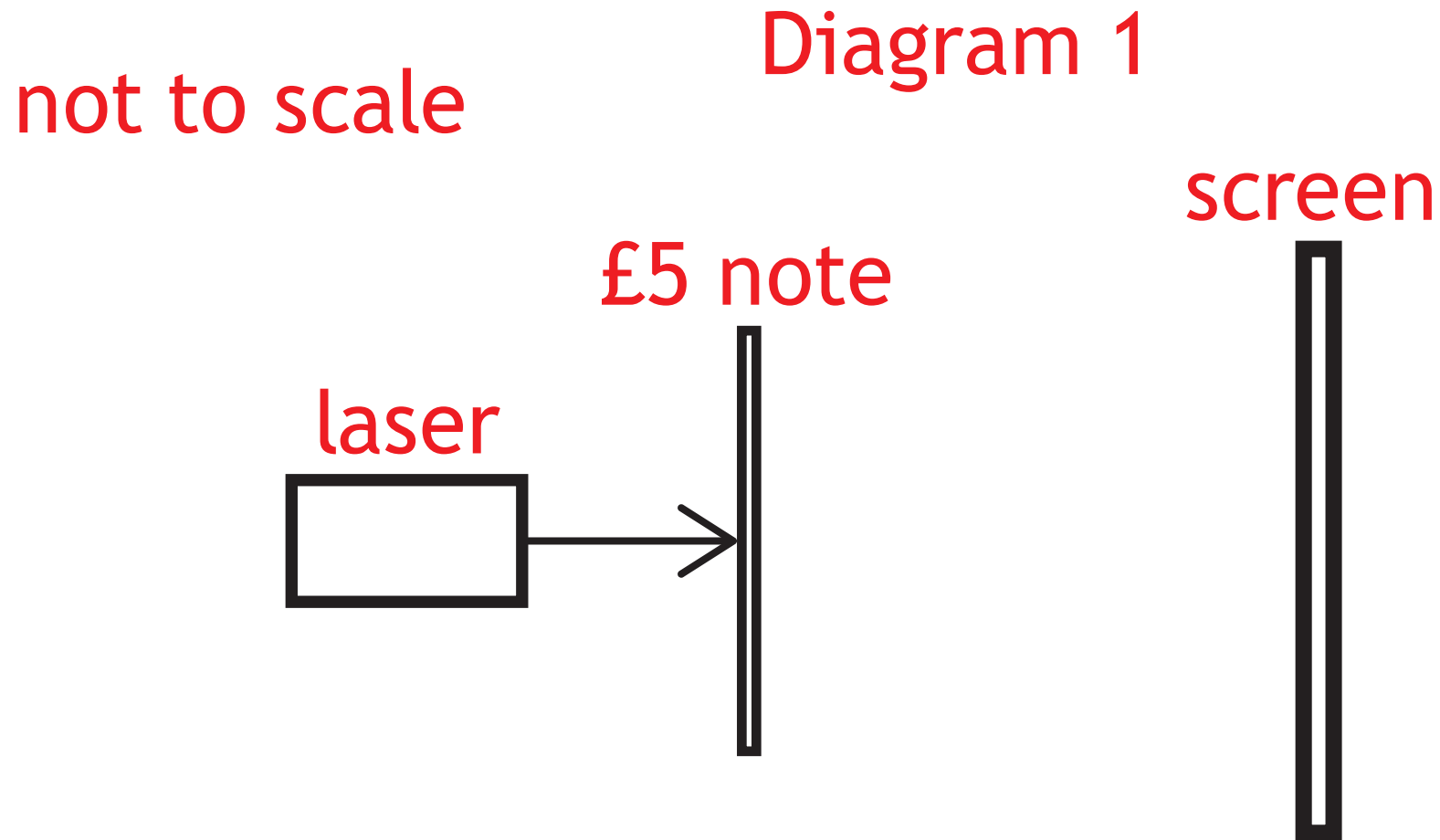
0

1.05

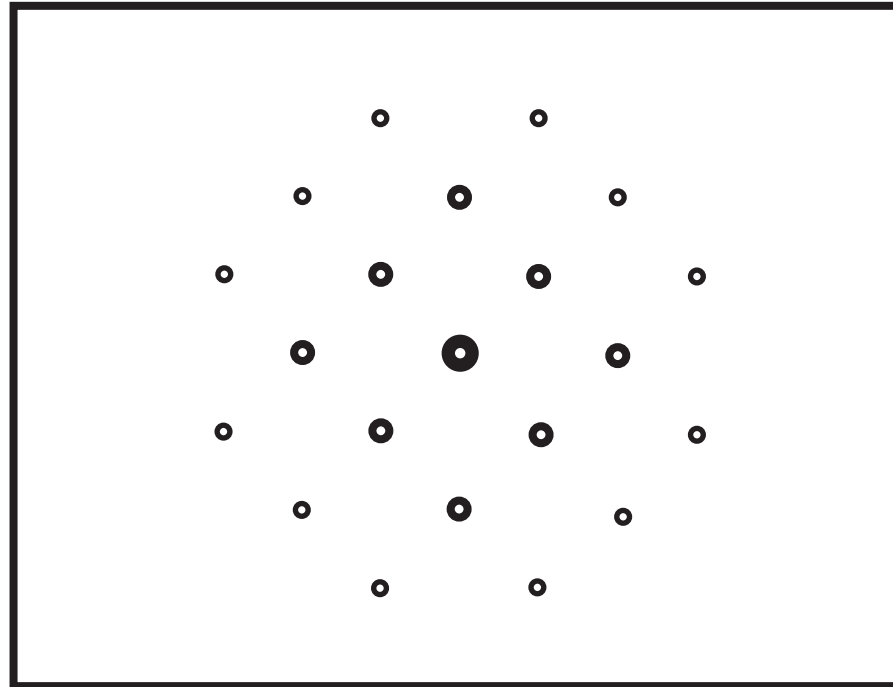
*frequency ( $\times 10^{15}$  Hz)*

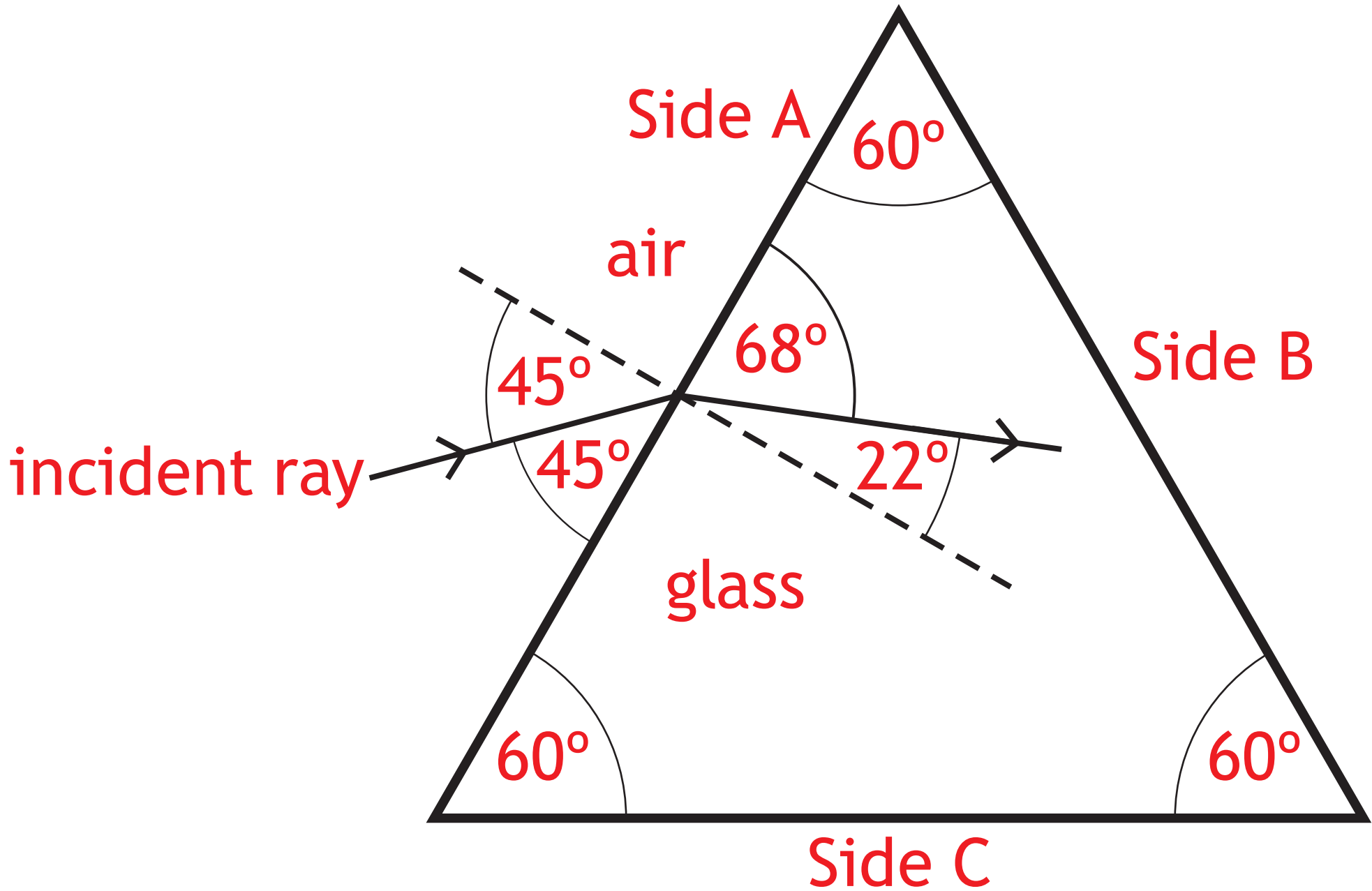
not to scale



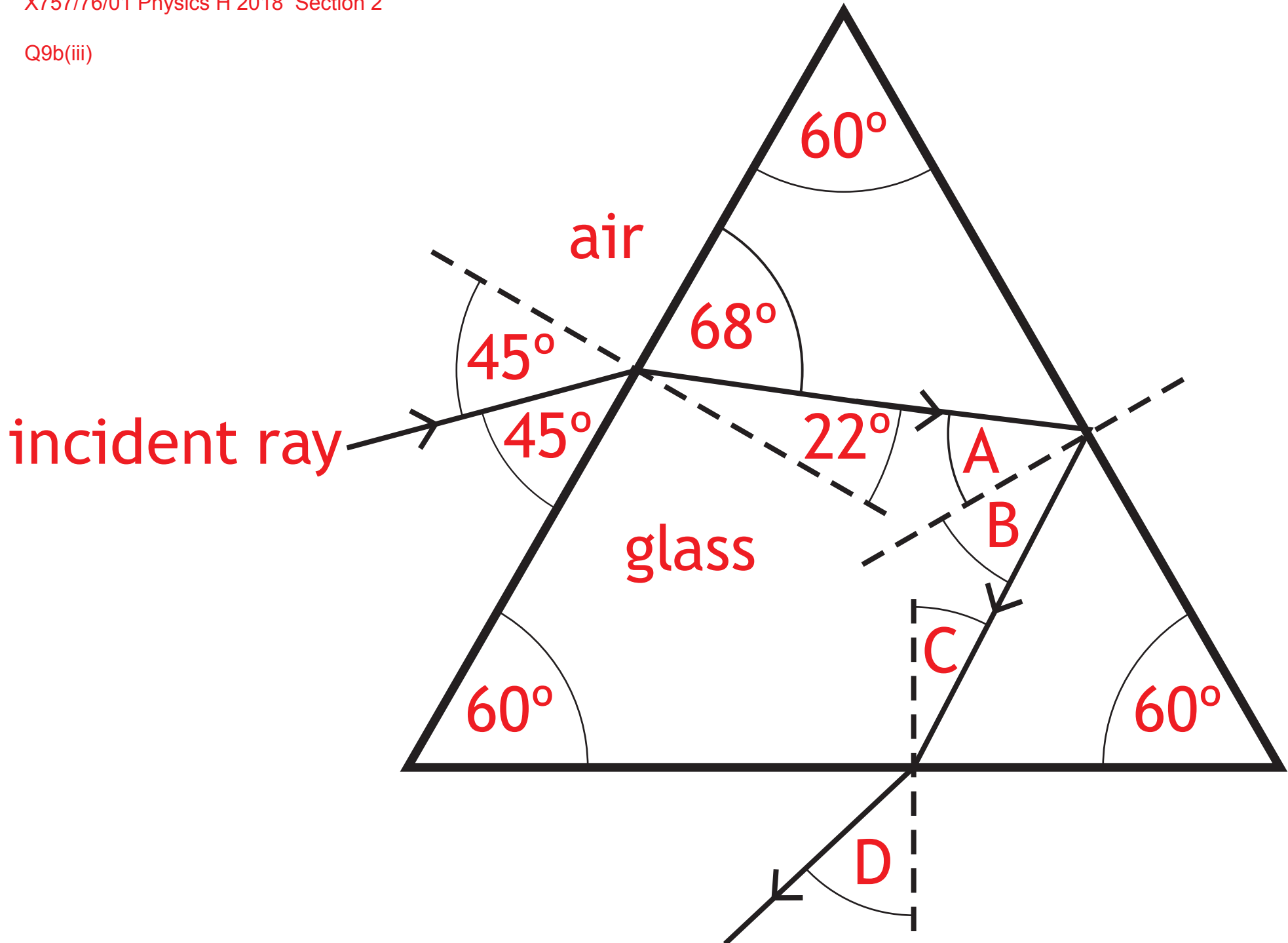


## Diagram 2

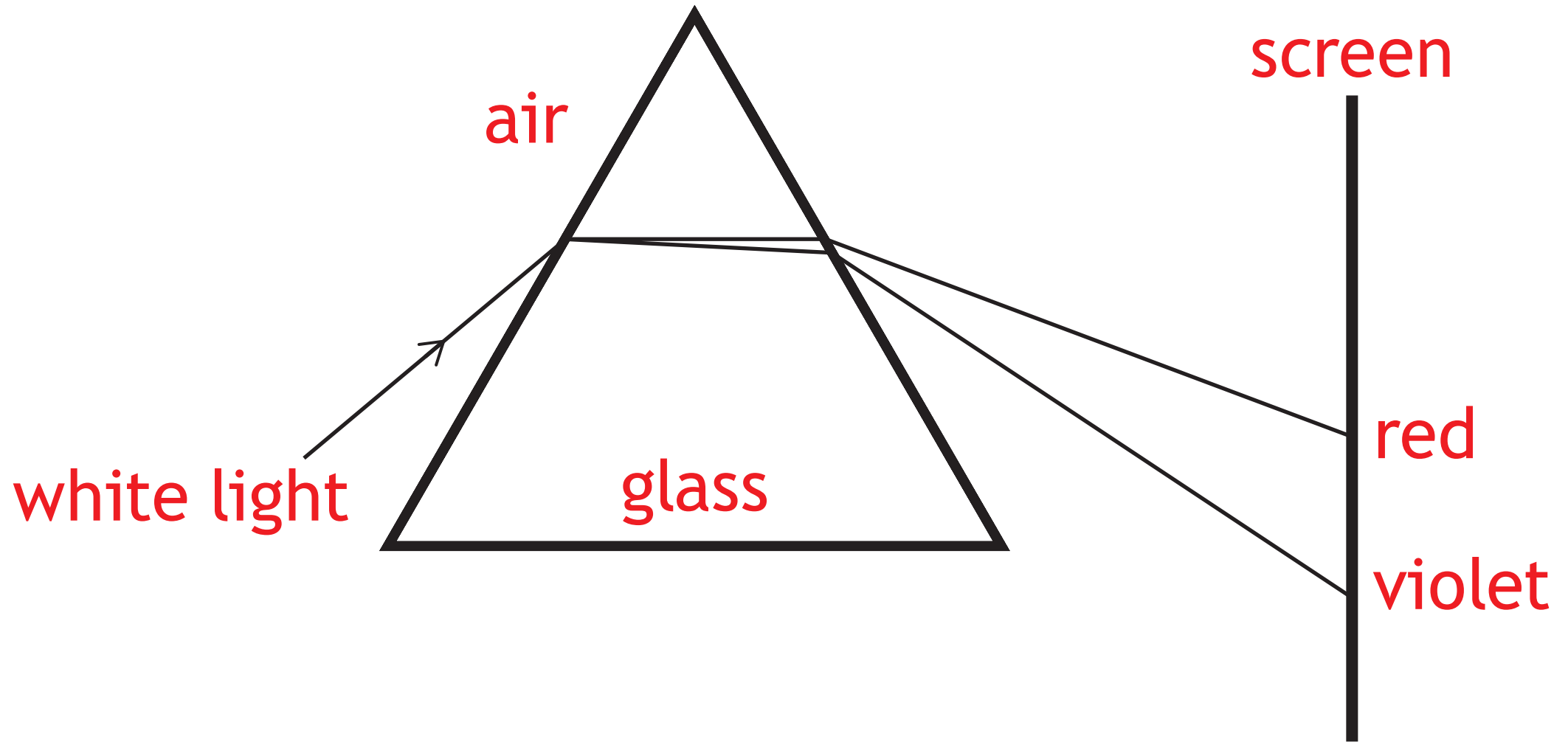




Q9b(iii)



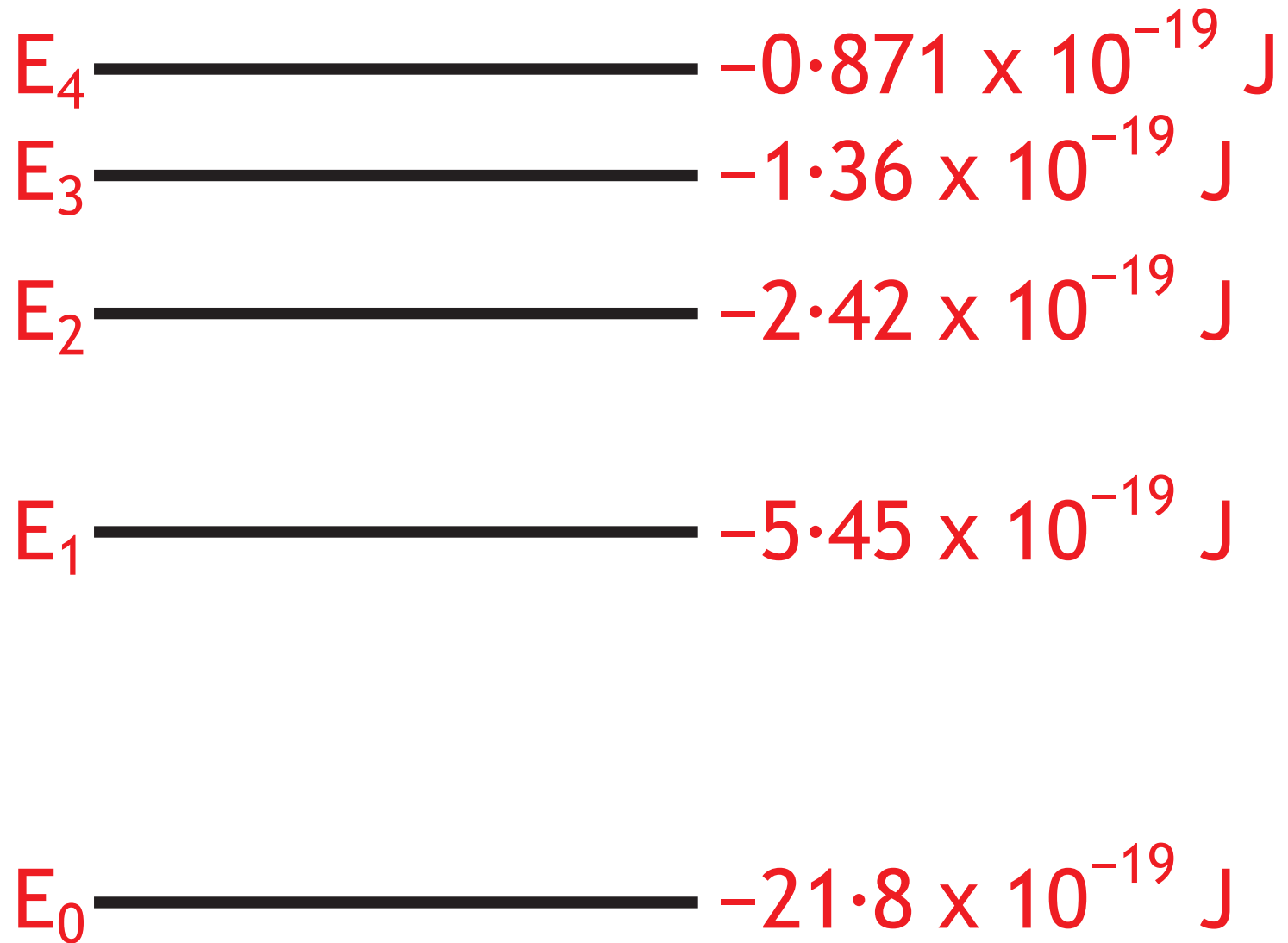




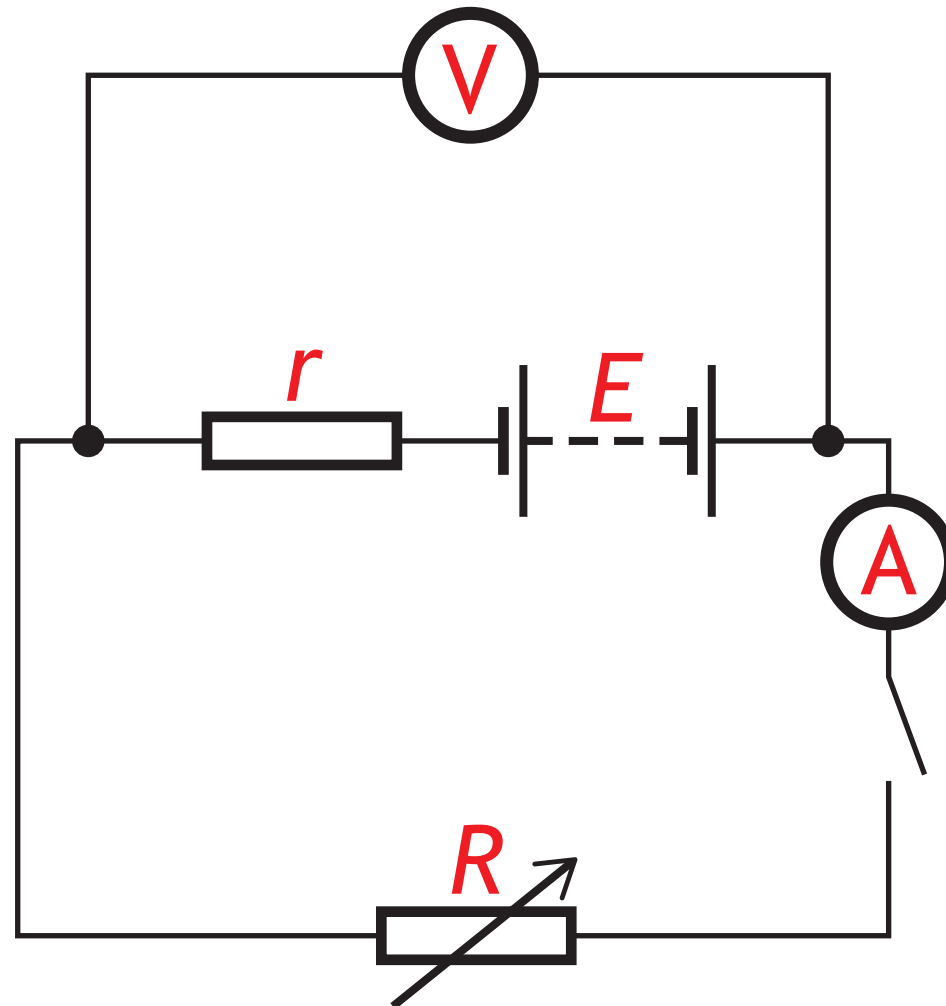
Q10



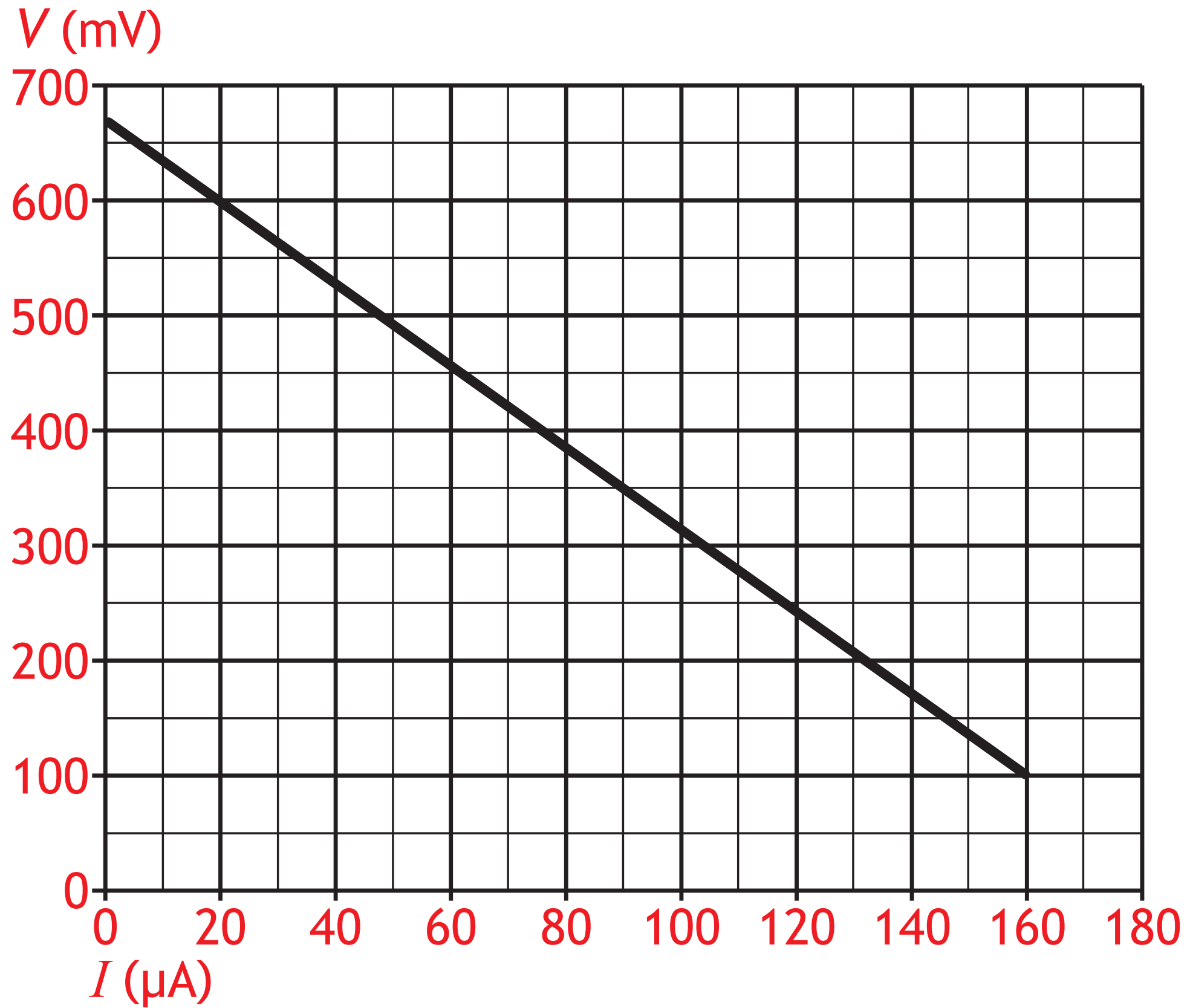
Q10b

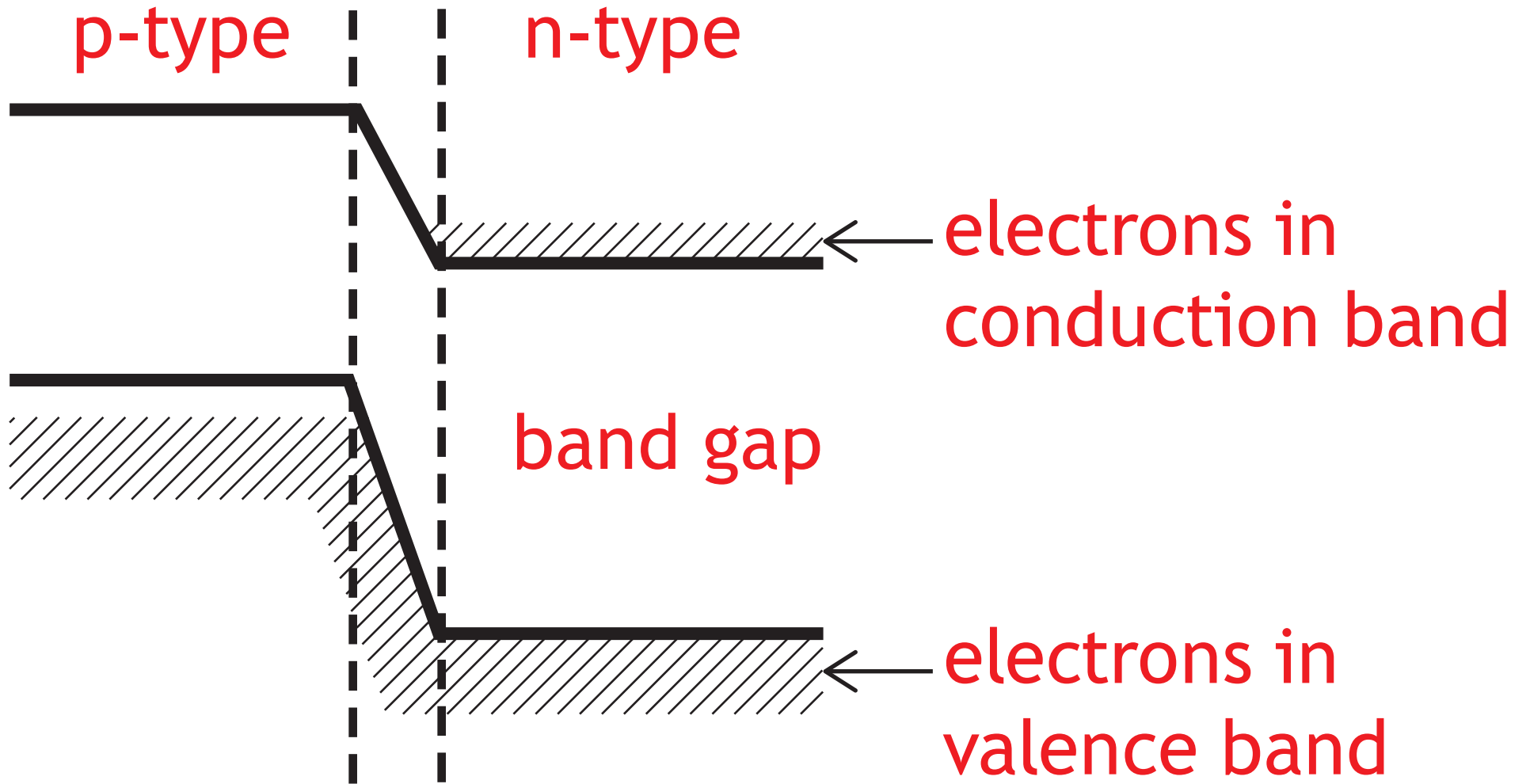


Q11

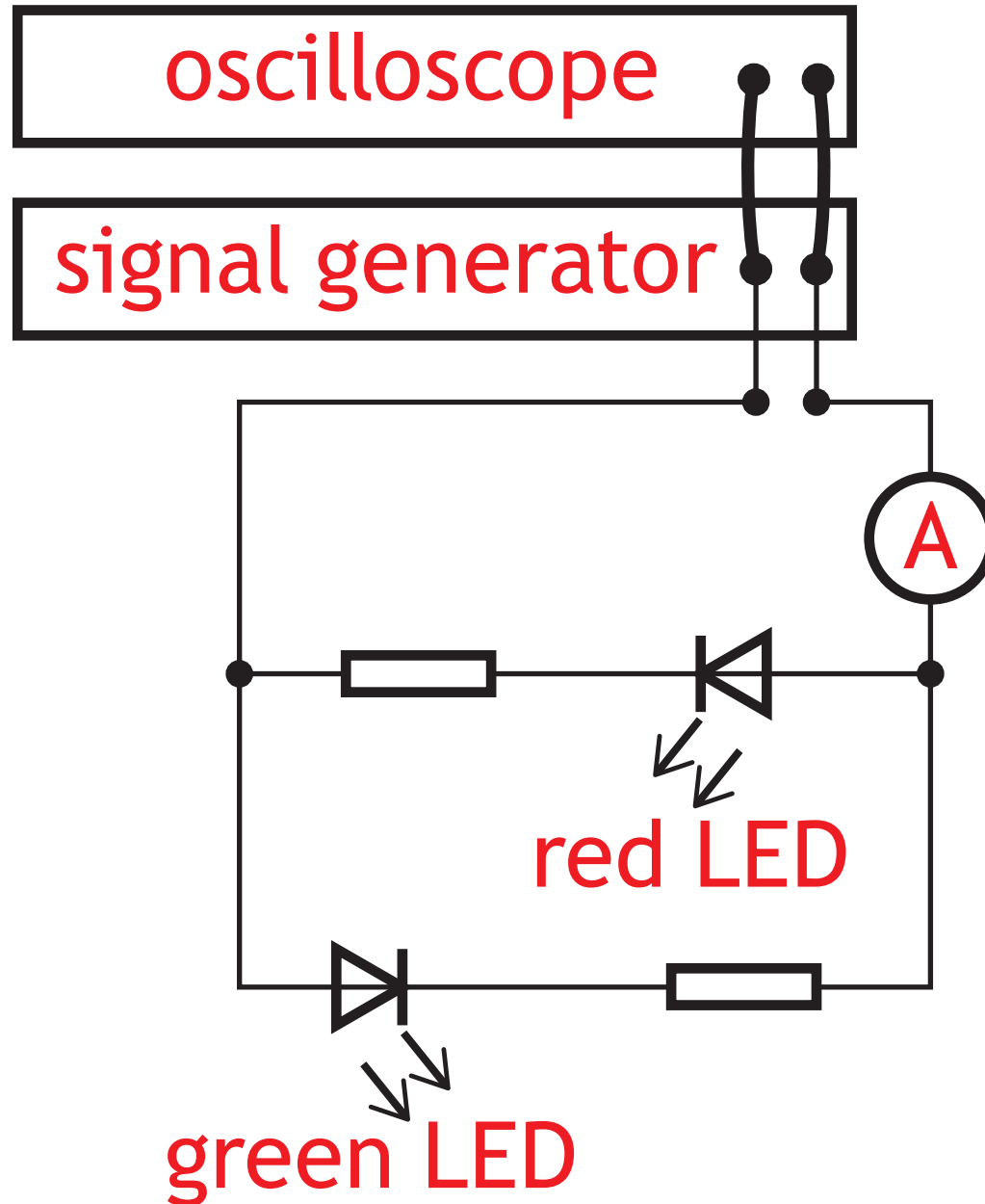


Q11b

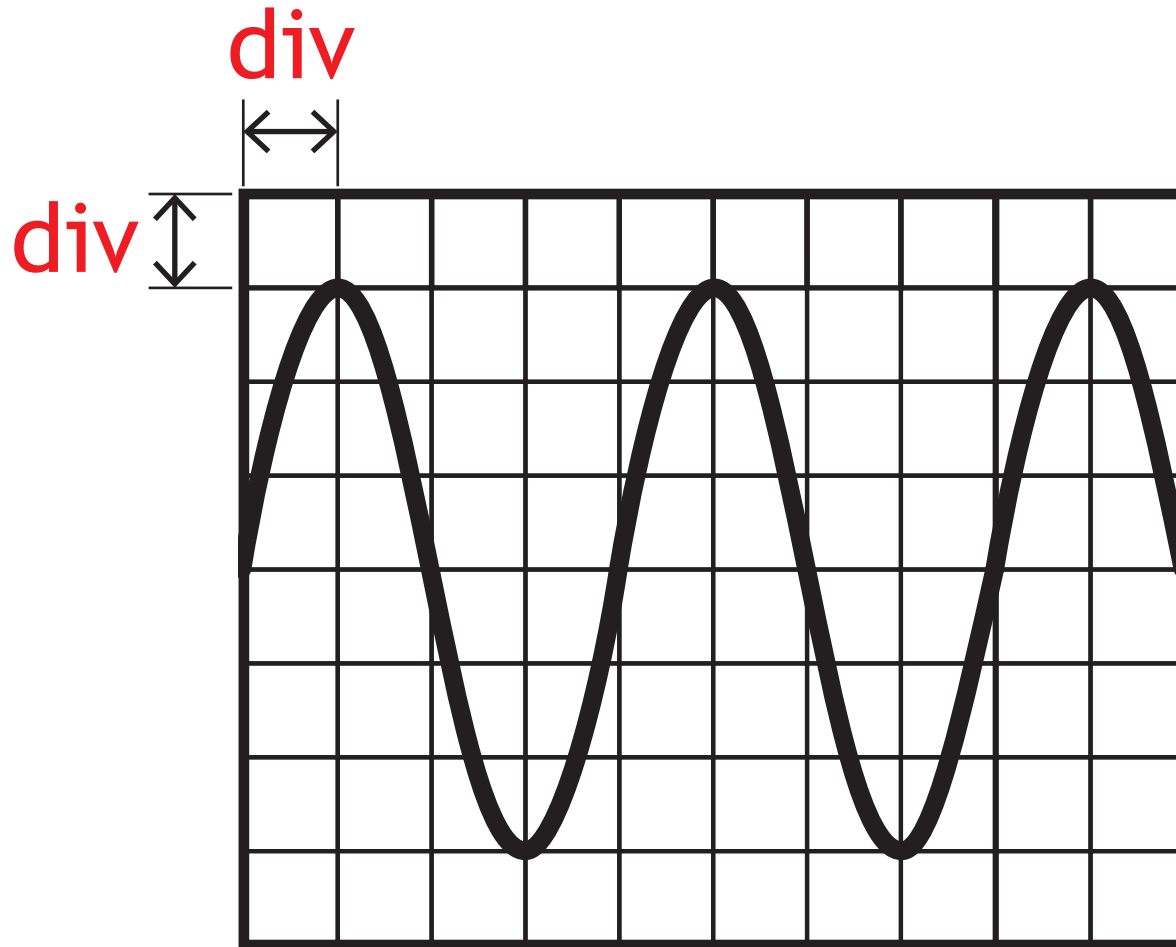




# Diagram 1

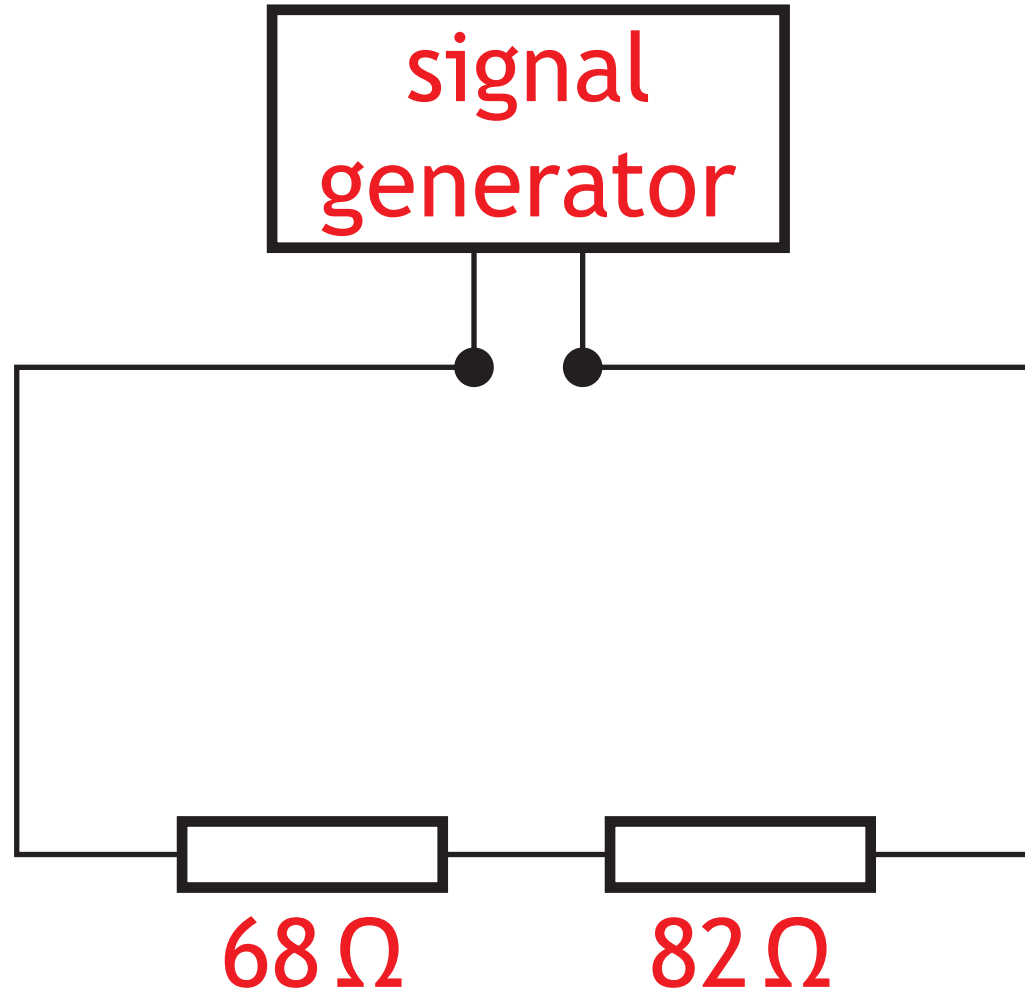


# Diagram 2

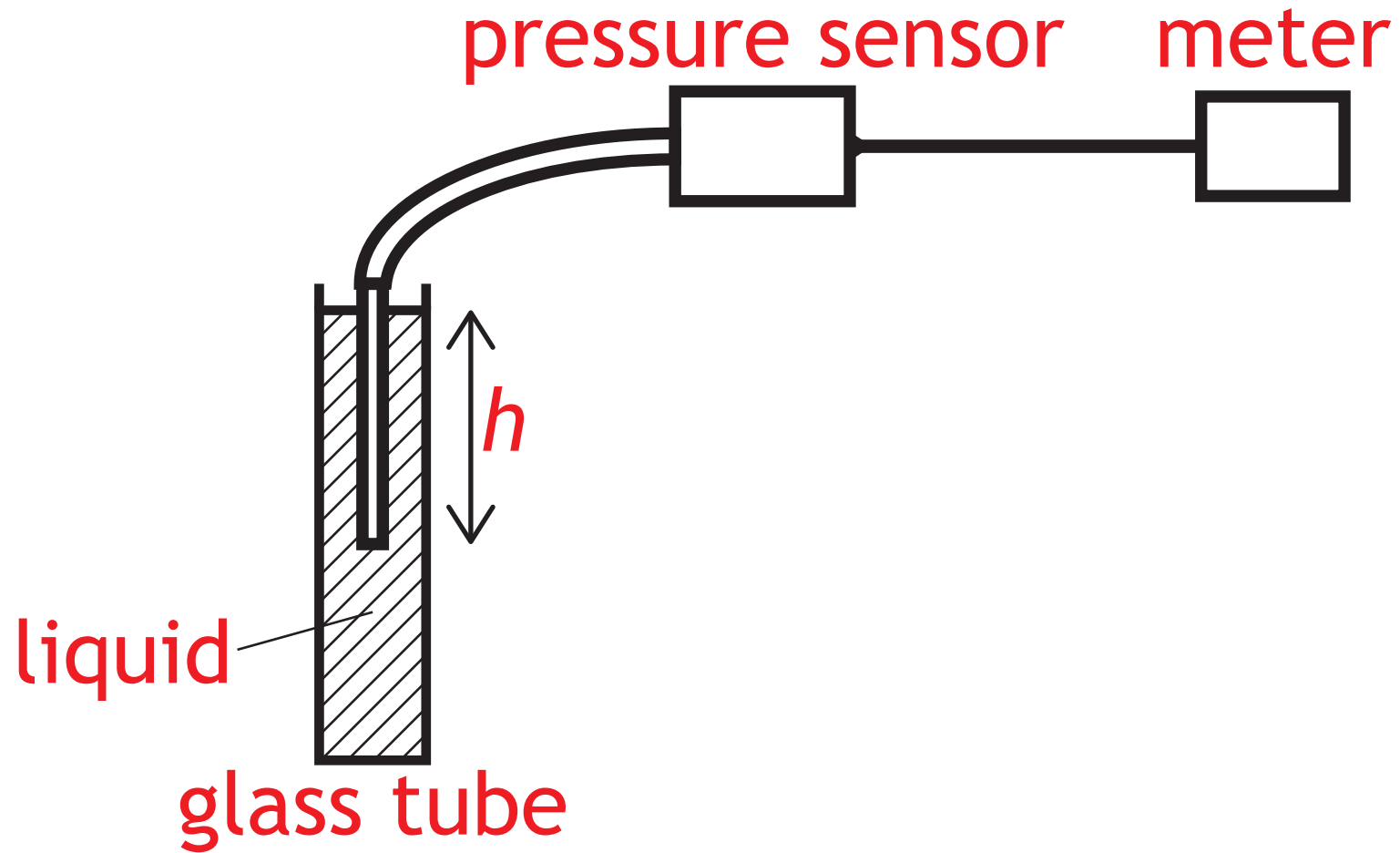




Q12b



Q13



Q13b(i)

*Pressure  $p$  (kPa)*

