2011

1. (a) A particle is released from rest at A and falls vertically passing two points B and C.

It reaches B after t seconds and takes $\frac{2t}{7}$ seconds to fall from B to C, a distance of 2.45 m.

Find the value of t.

AB $\quad s = ut + \frac{1}{2}ft^2$

$h = 0 + \frac{1}{2}gt^2$ 5

AC $\quad s = ut + \frac{1}{2}ft^2$

$h + 2.45 = 0 + \frac{1}{2}g\left(\frac{9t}{7}\right)^2$ 5

$\frac{1}{2}gt^2 + \frac{1}{4}g = 0 + \frac{1}{2}g\left(\frac{81t^2}{49}\right)$ 5

$2t^2 + 1 = \frac{162t^2}{49}$

$64t^2 = 49$

$\Rightarrow \quad t = \frac{7}{8}$ s 5 20