SUVAT Equations

$$v = u + at$$ — Missing: s

$$v^2 = u^2 + 2as$$ — Missing: t

$$s = ut + \tfrac{1}{2}at^2$$ — Missing: v

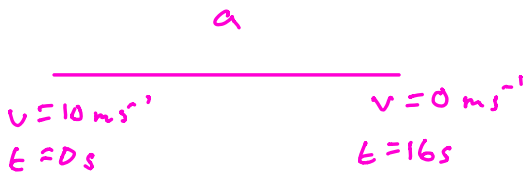
$$s = vt - \tfrac{1}{2}at^2$$ — Missing: u

$$s = \frac{(u+v)}{2}t$$ — Missing: a

u initial velocity
v final velocity
s displacement
a acceleration
t time

Exercise 9C

2)



$$v = u + at$$
$$0 = 10 + 16a$$
$$-10 = 16a$$
$$-\frac{10}{16} = a$$
$$a = -\frac{5}{8} = -0.625 \text{ ms}^{-2}$$

Deceleration $= 0.625 \text{ ms}^{-2}$

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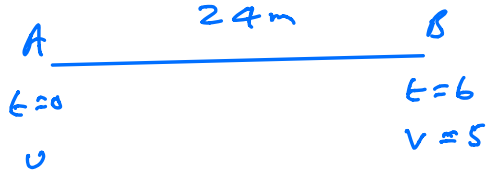
5)



a) u

$$s = \frac{(u+v)}{2}t$$
$$24 = \frac{(u+5)}{2} \times 6$$
$$8 = u + 5$$

$u = 3\,ms^{-1}$

b) $v = u + at$

$5 = 3 + 6a$

$2 = 6a$

$\frac{2}{6} = a$

$a = \frac{1}{3}\,ms^{-2}$

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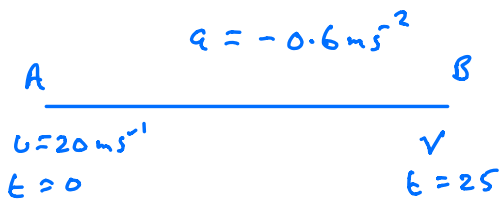
7) $72\,kmh^{-1} = \frac{72 \times 1000}{3600} = 20\,ms^{-1}$



$v = u + at$

$v = 20 - 0.6 \times 25$

$v = 5\,ms^{-1}$

$v = 18\,kmh^{-1}$

b) $s = \left(\frac{u+v}{2}\right)t = \frac{(20+5)}{2} \times 25 = 312.5\,m$

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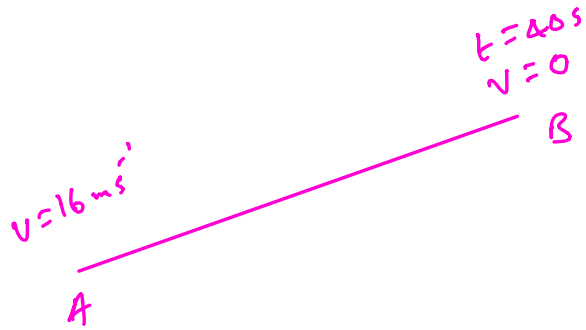
9)



$v = u + at$

$0 = 16 + 40a$

$-16 = 40a$

$-\frac{16}{40} = a$

$a = -0.4\,ms^{-2}$

a) deceleration $= 0.4\,ms^{-2}$

b) $s = \frac{(u+v)}{2}t = \frac{(16+0)}{2} \times 40$

$= 320\ m$

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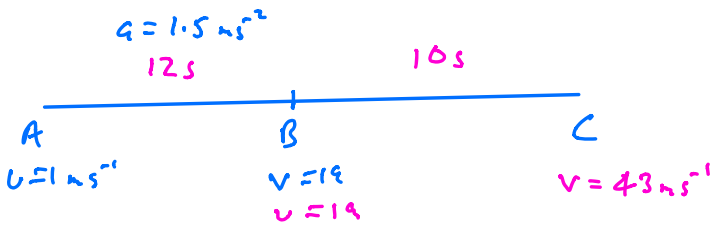
11)



$v = u + at$

$v = 1 + 1.5 \times 12$

a) $v = 19\ ms^{-1}$

$v = u + at$

$43 = 19 + 10a$

$24 = 10a$

b) $a = 2.4\ ms^{-2}$

$s_1 = \frac{(u+v)}{2}t$

$s_1 = \frac{(1+19)}{2} \times 12$

$s_1 = 120\ m$

$s_2 = \frac{(u+v)}{2}t$

$= \frac{(19+43)}{2} \times 10$

$= 310\ m$

$s = s_1 + s_2$

$= 120 + 310$

$= 430\ m$

Homework Exercise 9C Even Numbers