Author: Mr. Fan

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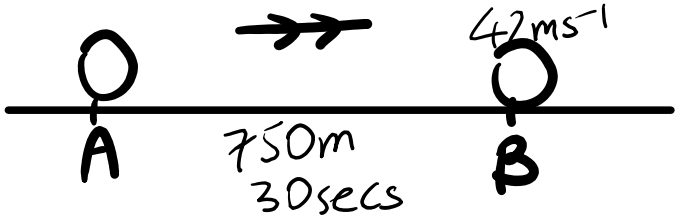
Year 1 Mechanics - Exam Question Bank

37a)



A → B

$s = 750$

u

$v = 42$

$a = ?$

$t = 30$

$s = vt - \frac{1}{2}at^2$

$750 = 42(30) - \frac{1}{2}(a)(30^2)$

$750 = 1260 - 450a$

$450a = 510$

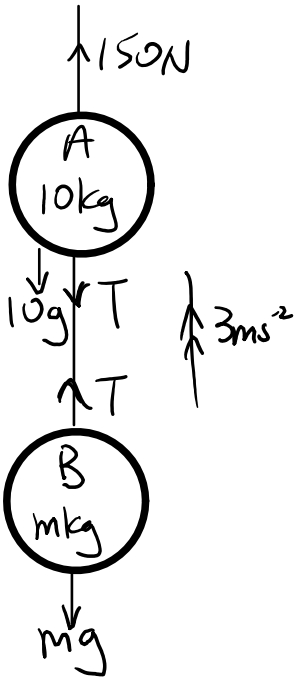
$a = \frac{17}{15} = 1.13 ms^{-2}$

37b) $v = u + at$

$42 = u + (\frac{17}{15})(30)$

$42 = u + 34$

$u = 8 ms^{-1}$



38a) Consider system as a whole

$F = ma$ (↑)

$(150 + T) - (T + 10g + mg) = (10 + m) \times 3$ (m, a)

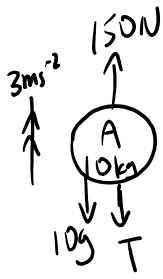
$150 + T - T - 98 - 9.8m = 30 + 3m$

$150 - 98 - 30 = 3m + 9.8m$

$22 = 12.8m$

$m = 1.72\text{kg}$

38b) Consider A



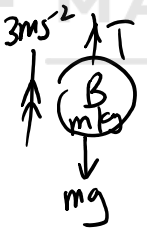
$F = ma$ (↑)

$150 - (10g + T) = 10(3)$ (m, a)

$150 - 98 - T = 30$

$T = 22\text{N}$

or Consider B



$F = ma$ (↑)

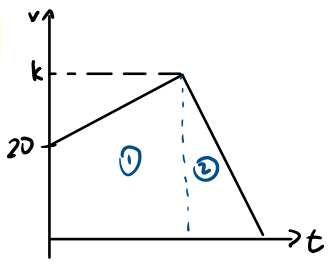
$T - mg = m(3)$ (m, a)

$T = 3m + mg$

$T = 22\text{N}$

Year 1 Mechanics - Exam Question Bank

39a)



39b) Distance = Area = 1120

①: Trapezium: $\frac{1}{2}(20+k)\times 40$

$= 400 + 20k$

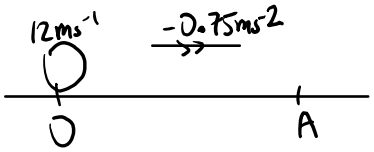
②: $\frac{1}{2}(20)\times k = 10k$

$\Rightarrow 400 + 20k + 10k = 1120$

$30k = 720$

$k = \underline{24}$

40a)



O→A

$s = ?$
$u = 12$
$v = 0$ ← A is the furthest point, so velocity is 0.
$a = -0.75$
t

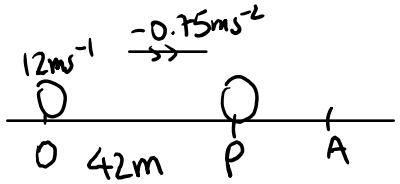
$v^2 = u^2 + 2as$

$0 = 12^2 + 2(-0.75)s$

$-144 = -1.5s$

$s = \underline{96m}$

40b)



O → P

$s = 42$
$u = 12$
v
$a = -0.75$
$t = ?$

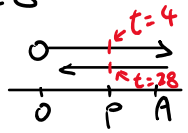
$s = ut + \frac{1}{2}at^2$

$42 = 12t + \frac{1}{2}(-0.75)t^2$

$0.375t^2 - 12t + 42 = 0$

$t = 4$ or 28

$\Rightarrow \underline{4 < t < 28}$



41) Resultant force $= \begin{pmatrix}-1\\3\end{pmatrix} + \begin{pmatrix}p\\q\end{pmatrix} = \begin{pmatrix}-1+p\\3+q\end{pmatrix}$ N

Two forces are parallel means the gradients of the force vectors are the equal

gradient of $\begin{pmatrix}-1+p\\3+q\end{pmatrix} = \frac{3+q}{-1+p}$ ← j-component / ← i-component

gradient of $\begin{pmatrix}3\\-4\end{pmatrix} = \frac{-4}{3}$

$\frac{3+q}{-1+p} = \frac{-4}{3}$

$3(3+q) = -4(-1+p)$

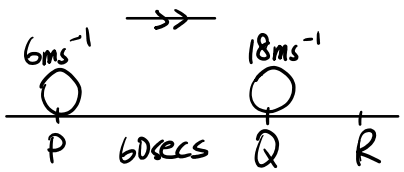
$9 + 3q = 4 - 4p$

$\underline{4p + 3q + 5 = 0}$

Year 1 Mechanics - Exam Question Bank

42

ai)



P → Q

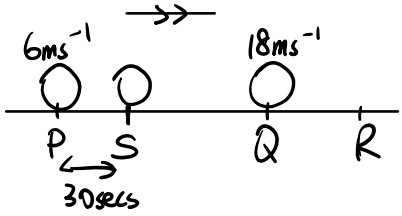
s = ?
u = 6
v = 18
a
t = 60

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

$s = \frac{(6+18)\times 60}{2}$

$s = 720\text{m}$

aii)



*Acceleration is constant throughout the whole journey.
*Distance PS ≠ Distance SQ because the particle is speeding up, meaning more distance is travelled in SQ than PS.

P → Q

s =
u = 6
v = 18
a = ?
t = 60

$v = u + at$

$18 = 6 + a(60)$

$12 = 60a$

$a = 0.2\text{ms}^{-2}$

P → S

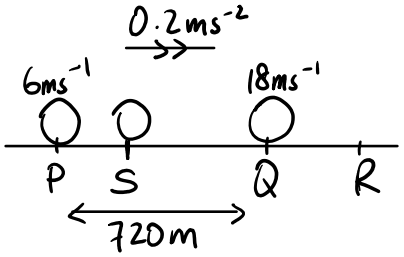
s =
u = 6
v = ?
a = 0.2
t = 30

$v = u + at$

$v = 6 + 0.2(30)$

$v = 12\text{ms}^{-1}$

42b)



PQ : QR

3 : 2

×240 ↓ ×240

720 : 480m

QR = 480m

Q → R

s = 480
u = 18
v =
a = 0.2
t = ?

$s = ut + \frac{1}{2}at^2$

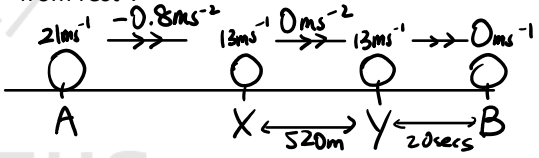
$480 = 18t + \frac{1}{2}(0.2)t^2$

$480 = 18t + 0.1t^2$

$0.1t^2 + 18t - 480 = 0$

$t = 23.6\text{ secs}$ or ~~-203~~

43a) I think there's a mistake in the question. Ignore "~~starts from rest~~".



A → X

s = ?
u = 21
v = 13
a = −0.8
t = ?

$v^2 = u^2 + 2as$

$13^2 = 21^2 + 2(-0.8)s$

$-272 = -1.6s$

$s = 170\text{m}$

$v = u + at$

$13 = 21 + (-0.8)t$

$-8 = -0.8t$

$t = 10\text{ secs}$

X → Y

s = 520
u = 13
v = 13
a = 0 ← constant velocity means a = 0
t = ?

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

$520 = \frac{(13+13)t}{2}$

$1040 = 26t$

$t = 40\text{ secs}$

Y → B

s = ?
u = 13
v = 0
t = 20

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

$s = \frac{(13+0)(20)}{2}$

$s = 130\text{m}$

Total distance
= 170 + 520 + 130
= 820m

Total time
= 10 + 40 + 20 = 70

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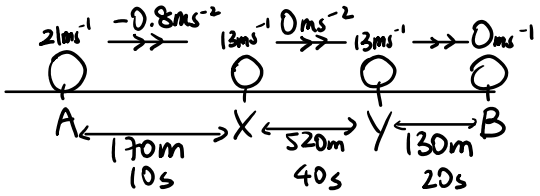
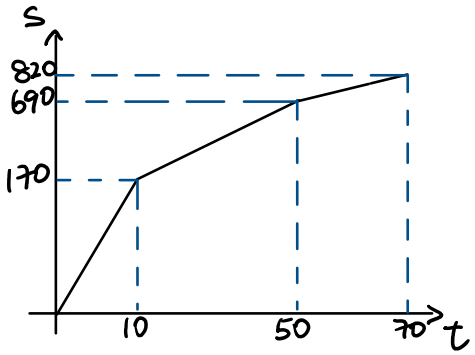
43b)



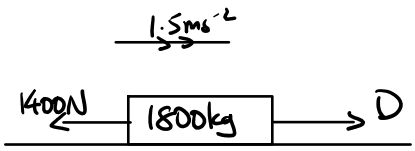


44a)

s
$u = 0$
$v = 12$
$a = ?$
$t = 8$

$v = u + at$
$12 = 0 + a(8)$
$a = 1.5\ ms^{-2}$

44b)



$F = ma \ (\rightarrow)$

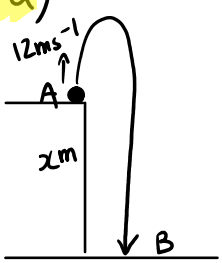
$D - 1400 = 1800 \times 1.5$

$D = 2700 + 1400$

$D = 4100N$

44c) The assumption is unrealistic because resistance increases as the car speeds up

45a)



$A \Rightarrow B$

$s = -x$ ← negative displacement because particle travels up, then down, and B is below A.

$u = 12$

$v =$

$a = -9.8$

$t = 3$

$s = ut + \frac{1}{2}at^2$

$-x = 12(3) + \frac{1}{2}(-9.8)(3)^2$

$-x = -8.1$

$x = 8.1m$

45b) Since the value of acceleration is smaller when air resistance is included, the value of x will also be lower.

$s = ut + \frac{1}{2}at^2$ (s ↓, $\frac{1}{2}at^2$ ↓) If RHS decreases, LHS does too!

46)

$v = 2t^2 - 3t + 4$

$\frac{dv}{dt} = 4t - 3$

min. velocity $\Rightarrow \frac{dv}{dt} = 0$

$4t - 3 = 0$

$t = \frac{3}{4}$

$s = \int v\,dt$

$s = \int 2t^2 - 3t + 4\,dt$

$s = \frac{2t^3}{3} - \frac{3t^2}{2} + 4t + c$

When $t = 0$, $s = 0$ (P is at the origin)

$\Rightarrow c = 0$ → need to show in exam

$\Rightarrow s = \frac{2t^3}{3} - \frac{3t^2}{2} + 4t$

When $t = \frac{3}{4}$,

$s = \frac{2(\frac{3}{4})^3}{3} - \frac{3(\frac{3}{4})^2}{2} + 4(\frac{3}{4}) = 2.4375m$

47a) $F_1 + F_2 + F_3 = 0$ ← At rest = equilibrium

$\begin{pmatrix} a \\ b \end{pmatrix} + \begin{pmatrix} b \\ -2a \end{pmatrix} + \begin{pmatrix} -7 \\ 8 \end{pmatrix} = \begin{pmatrix} 0 \\ 0 \end{pmatrix}$

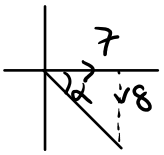
$\Rightarrow \begin{matrix} a + b - 7 = 0 \\ b - 2a + 8 = 0 \end{matrix} \Rightarrow \begin{matrix} a = 5 \\ b = 2 \end{matrix}$

47b) $R = F_1 + F_2$

$R = \begin{pmatrix} 5 \\ 2 \end{pmatrix} + \begin{pmatrix} 2 \\ -10 \end{pmatrix} = \begin{pmatrix} 7 \\ -8 \end{pmatrix}$

$|R| = \sqrt{7^2 + (-8)^2} = \sqrt{113}\ N$

47c) $R = 7i - 8j$



$\tan\alpha = \frac{8}{7}$

$\alpha = \tan^{-1}\left(\frac{8}{7}\right) = 49°$

47d) $F = ma$

$\sqrt{113} = 0.8a$

$a = \frac{5\sqrt{113}}{4}$

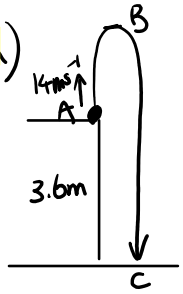
$s = ?$, $u = 0$, v, $a = \frac{5\sqrt{113}}{4}$, $t = 3$

$s = ut + \frac{1}{2}at^2$

$s = 0 + \frac{1}{2}\left(\frac{5\sqrt{113}}{4}\right)(3^2)$

$s = 59.8\text{m}$

48a)



A → B

$s = ?$, $u = 14$, $v = 0$, $a = -9.8$, $t = X$

B is the highest point, velocity = 0

$v^2 = u^2 + 2as$

$0 = 14^2 + 2(-9.8)s$

$19.6s = 196$

$s = 10\text{m}$

48b) A → C

$s = -3.6$, $u = 14$, $V = ?$, $a = -9.8$, $t =$

$v^2 = u^2 + 2as$

$v^2 = 14^2 + 2(-9.8)(-3.6)$

$v^2 = 266.56$

$v = 16.3\text{ms}^{-1}$

(note: speed = 16.3, but velocity is −16.3)

48c) $v = u + at$

$-16.3 = 14 + (-9.8)t \Rightarrow t = 3.09\text{s}$

49a) $v = pt^2 + qt + r$

$\frac{dv}{dt} = 2pt + q$

speed is minimum

- When $t = 3$, $\frac{dv}{dt} = 0$

$0 = 2p(3) + q$

$6p + q = 0$ — (1)

- When $t = 0$, $v = 10$

$10 = p(0) + q(0) + r$

$r = 10$

$\Rightarrow v = pt^2 + qt + 10$

- When $t = 2$, $v = 5$

$5 = p(2)^2 + q(2) + 10$

$-5 = 4p + 2q$ — (2)

Solve (1) and (2) as simultaneously

$p = \frac{5}{8}$, $q = \frac{-15}{4}$

$a = \frac{dv}{dt} = 2pt + q$

$= 2\left(\frac{5}{8}\right)t - \frac{15}{4}$

$= \frac{5}{4}t - \frac{15}{4}$

When $t = 4$, $a = \frac{5}{4}(4) - \frac{15}{4}$

$a = \frac{5}{4}\text{ms}^{-2}$ or 1.25ms^{-2}

49b) Third second of motion = Difference in displacement between t=2 and t=3

$$s = \int_2^3 v\,dt$$

$$s = \int_2^3 \frac{5}{8}t^2 - \frac{15}{4}t + 10\,dt$$

$$s = \left[\frac{5}{24}t^3 - \frac{15}{8}t^2 + 10t\right]_2^3$$

$$s = \left[\frac{5}{24}(3)^3 - \frac{15}{8}(3)^2 + 10(3)\right] - \left[\frac{5}{24}(2)^2 - \frac{15}{8}(2)^2 + 10(2)\right]$$

$$s = \frac{75}{4} - \frac{85}{6} = \underline{\underline{\frac{55}{12}\text{m}}}$$

50a) When $t = 30$,

$$s = 25(30) - 0.3(30)^2$$

$$s = \underline{\underline{480\text{m}}}$$

50b) Car 1: $s_1 = 25t - 0.3t^2$

Car 2: Constant acceleration

$s = s_2$
$u = 15$
v
$a = 0.1$
$t = t$

$$s_2 = 15t + \frac{1}{2}(0.1)t^2$$

$$s_2 = 15t + 0.05t^2$$

$\because s_1 + s_2 = 480\text{m}$

$$\therefore 25t - 0.3t^2 + 15t + 0.05t^2 = 480$$

$$-0.25t^2 + 40t = 480$$

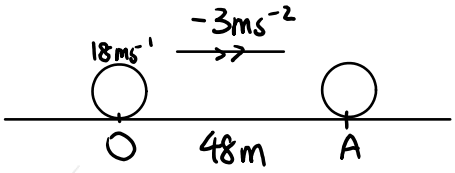
$$-0.25t^2 + 40t - 480 = 0$$

$$t = 13.067 \text{ or } \cancel{146}$$

When $t = 13.067$, $s_1 = 25(13.067) - 0.3(13.067)^2 = \underline{\underline{275.5\text{m}}}$

Use s_1 but not s_2 because Q wants distance away from A, not B.

51a)



O → A

$s = 48$
$u = 18$
v
$a = -3$
$t = ?$

$$s = ut + \frac{1}{2}at^2$$

$$48 = 18t + \frac{1}{2}(-3)t^2$$

$$0 = -\frac{3}{2}t^2 + 18t - 48$$

$$t = \underline{\underline{4 \text{ or } 8}}$$

51b) O → O

$s = 0$ (return to the same point)
$u = 18$
v
$a = -3$
$t = ?$

$$s = ut + \frac{1}{2}at^2$$

$$0 = 18t + \frac{1}{2}(-3)t^2$$

$$0 = -1.5t^2 + 18t$$

$$t = \cancel{0} \text{ or } \underline{\underline{12}}$$

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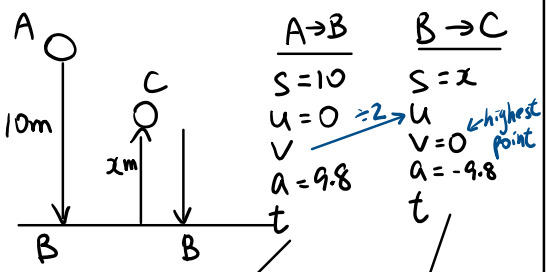
52ai)



$v^2 = u^2 + 2as$

$v^2 = 0 + 2(9.8)(10)$

$v = 14$

$v^2 = u^2 + 2as$

$0 = 7^2 + 2(-9.8)x$

$19.6x = 49$

$x = \underline{2.5m}$

52aii) Total time = "A to B" + "B to B"

A → B

$s = ut + \frac{1}{2}at^2$

$10 = 0 + \frac{1}{2}(9.8)t^2$

$t = \frac{10}{7}$

B → B

$s = 0$ (return to same point)

$u = 7$

v

$a = -9.8$

$t = ?$

$s = ut + \frac{1}{2}at^2$

$0 = 7t + \frac{1}{2}(-9.8)t^2$

$0 = 7t - 4.9t^2$

$t = 0$ or $t = \frac{10}{7}$

Total time = $\frac{10}{7} + \frac{10}{7} = \underline{2.86 \text{ secs}}$

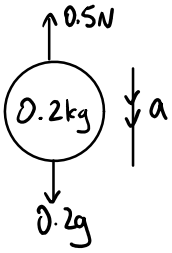
52b)

$F = ma$ (↓)

$0.2g - 0.5 = 0.2a$

$1.46 = 0.2a$

$a = 7.3 \text{ ms}^{-2}$



A → B

$s = 10$

$u = 0$

$v = ?$

$a = 7.3$

t

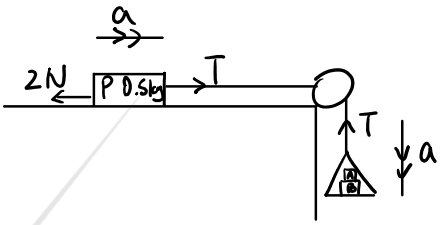
$v^2 = u^2 + 2as$

$v^2 = 0 + 2(7.3)(10)$

$v = \underline{12.1 \text{ ms}^{-1}}$

52c) The value is lower because the rebound speed is lower, so the ball will bounce "less high".

53a)

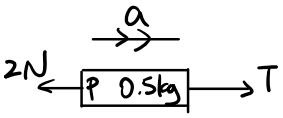


Consider P

$F = ma$ (→)

$T - 2 = 0.5a$

$T = 0.5a + 2$



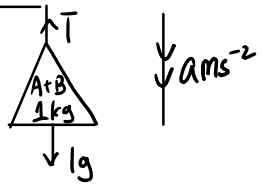
Consider scale pan (A+B together)

$F = ma$ (↓)

$1g - T = 1a$

$9.8 - T = a$

$T = 9.8 - a$



53b) $0.5a + 2 = 9.8 - a$

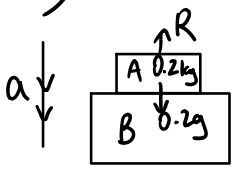
$1.5a = 7.8$

$a = \underline{5.2 \text{ ms}^{-2}}$

$T = 9.8 - 5.2 = \underline{4.6N}$

Year 1 Mechanics - Exam Question Bank

53c)



Force exerted on A by B = the Reaction force provided by B

$F = ma$ (↓)

$0.2g - R = 0.2 \times 5.2$

$R = 0.2g - 0.2 \times 5.2$

$R = \underline{\underline{0.92N}}$

53d) Tension is the same on both sides of pulley

54a) $s = (2-t)^4$

$s = 16 - 32t + 24t^2 - 8t^3 + t^4$

$v = \frac{ds}{dt}$

$v = -32 + 48t - 24t^2 + 4t^3$

Algebra way

$v = 4(t^3 - 6t^2 + 12t - 8)$

$v = 4(t-2)^3$

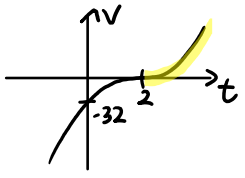
When $t \geq 2$, $(t-2)^3 \geq 0$

$\therefore v \geq 0$ when $t \geq 2$

Graphical way

When $v = 0$, $t = 2$ (triple root)

When $t = 0$, $v = -32$



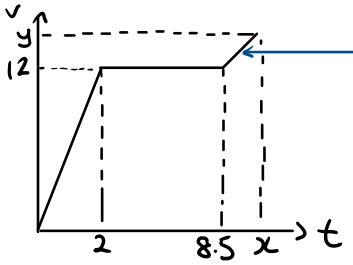
$\underline{\underline{k = 2}}$

54b) $a = \frac{dv}{dt}$

$a = 12t^2 - 48t + 48$

$a = 12(t^2 - 4t + 4) = \underline{\underline{12(t-2)^2}}$

55a)



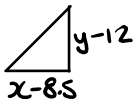
accel = gradient = 1.5

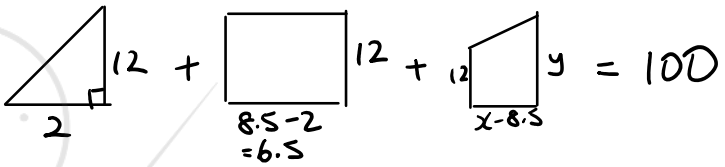
$\frac{y-12}{x-8.5} = 1.5$

$y - 12 = 1.5(x - 8.5)$

$y - 12 = 1.5x - 12.75$

$y = 1.5x - 0.75$





$\frac{12 \times 2}{2} + 6.5 \times 12 + \frac{(12+y)(x-8.5)}{2} = 100$

$12 + 78 + \frac{(12 + 1.5x - 0.75)(x - 8.5)}{2} = 100$

$\frac{(11.25 + 1.5x)(x - 8.5)}{2} = 10$

$11.25x - 95.625 + 1.5x^2 - 12.75x = 20$

$1.5x^2 - 1.5x - 115.625 = 0$

$x = 9.29$ or -8.29

$y = 1.5(9.29) - 0.75$

$y = \underline{\underline{13.2 ms^{-1}}}$

55b) It is unrealistic that a human being can accelerate uniformly. Or, a sprinter is more likely to accelerate much more rapidly in the beginning of the 100m race.

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56a) $v = \int a\,dt$

$v = \int 3 - \frac{2}{t^3}\,dt$

$v = 3t - \frac{2t^{-2}}{-2} + c$

$v = 3t + t^{-2} + c$

When $t=1$, $v=0$

$0 = 3 + 1 + c$

$c = -4$

$v = 3t + t^{-2} - 4$

56b) $s = \int v\,dt$

$s = \int 3t + t^{-2} - 4\,dt$

$s = \frac{3t^2}{2} - t^{-1} - 4t + d$

When $t=1$, $s=0$

$0 = \frac{3}{2} - 1 - 4 + d$

$d = \frac{7}{2}$

$s = \frac{3t^2}{2} - t^{-1} - 4t + \frac{7}{2}$

57a)

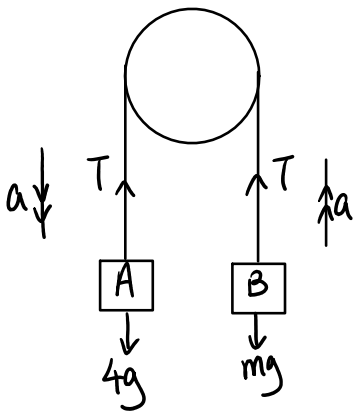
Consider A

$F = ma\ (\downarrow)$

$4g - T = 4 \times \frac{3}{5}g$

$39.2 - T = 23.52$

$T = 15.68\text{N}$



57b) Consider B

$F = ma\ (\uparrow)$

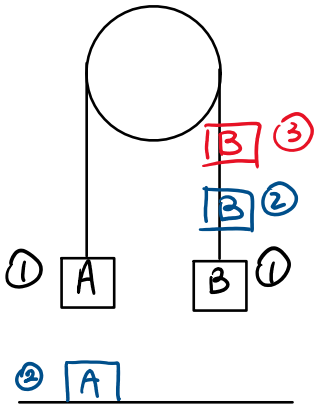
$T - mg = m \times \frac{3}{5}g$

$15.68 - 9.8m = 5.88m$

$15.68 = 15.68m$

$m = 1\text{ kg}$

57c)



① Initial position

② A hits ground
B moves up

③ B propels upwards.
String becomes loose
↳ No tension
↳ deceleration

① → ②

s
u = 0
v
a = $\frac{3}{5}$g
t = 0.6

equal

s
u = 3.528 ← highest point
v = 0
a = −g (no tension, so B is solely affected by gravity)
t

② → ③

$s = ut + \frac{1}{2}at^2$

$s = 0 + \frac{1}{2}(\frac{3}{5}g)(0.6)^2$

$s = 1.0584$

$v = u + at$

$v = 0 + \frac{3}{5}g(0.6)$

$v = 3.528$

$v^2 = u^2 + 2as$

$0 = 3.528^2 + 2(-9.8)s$

$19.6s = 3.528^2$

$s = 0.63504\text{m}$

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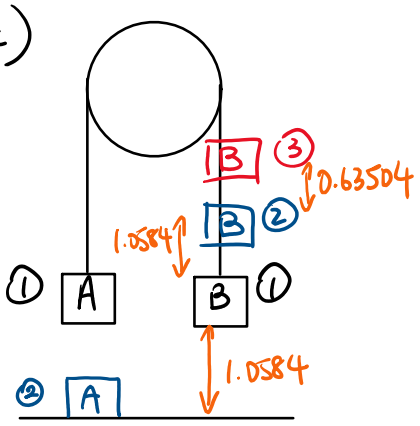
57c)



Greatest height from the ground

$= 1.0584$
1.0584
$+0.63504$

$2.75m$

If you want to watch a video tutorial of similar question A-Level Maths | Mechanics Year 1 | 10.6 - Pulleys Walkthrough | Edexcel

58) $a = \frac{k}{t^3}$ (inversely proportional)

$v = \int a\,dt$

$v = \int kt^{-3}\,dt$

$v = \frac{-k}{2t^2} + c$

"Velocity approaches limiting value of 6"

$\Rightarrow v = 6$ when $t \to \infty$

As $t \to \infty$, $\frac{-k}{2t^2} \to 0$ (as denominator is infinitely large)

$\therefore$ As $t \to \infty$, $v \to 0 + c = c$

When $v = 6$, $c = 6$.

$\Rightarrow v = \frac{-k}{2t^2} + 6$

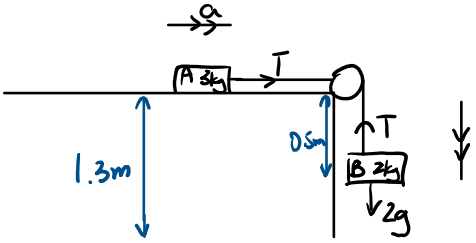
When $t = 1$, $v = 2$

$2 = \frac{-k}{2(1)^2} + 6 \Rightarrow k = -8$

$\Rightarrow v = \frac{8}{2t^2} + c$

$v = \frac{4}{t^2} + c$

59)



Particle A

$F = ma$ (→)

$T = 3a$

Particle B

$F = ma$ (↓)

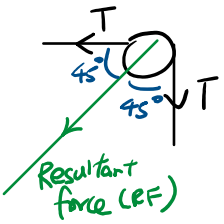
$2g - T = 2a$

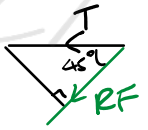
$2g - 3a = 2a$

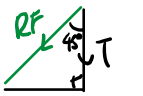
$a = 3.92\,ms^{-2}$

$T = 3(3.92) = 11.76N$

Forces exerted on pulley ⇒







$RF = T\cos 45°$

$RF = T\cos 45°$

Total $= T\cos 45 + T\cos 45$

$= (11.76\cos 45) \times 2$

$= 16.6N$

59b) Particle A

$s = 0.5m$ (string is 1m long, B is 0.5m below pulley)

$u = 0$

$v = ?$

$a = 3.92$

t

$v^2 = u^2 + 2as$

$v = \sqrt{0 + 2(3.92)(0.5)} = 1.98\,ms^{-1}$

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59c) Tension is the same on both sides of pulley

59d) When string breaks, B is 1m below the pulley and falls freely under gravity

$s = 0.3m$ (1.3m − 1m)
$u = 1.98$ (same speed as A hits the pulley as string is inextensible)
v
$a = 9.8$ (free falling)
$t = ?$

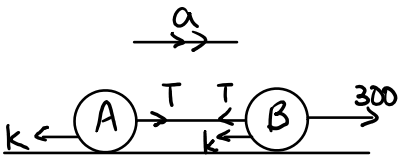
$s = ut + \frac{1}{2}at^2$

$0.3 = 1.98t + \frac{1}{2}(9.8)t^2$

$0 = 4.9t^2 + 1.98t - 0.3$

$t = \underline{\underline{0.117 \text{ sec}}}$

60a)



$s = 28.8$
$u = 0$
v
$a = ?$
$t = 2$

$s = ut + \frac{1}{2}at^2$

$28.8 = 0 + \frac{1}{2}(a)(2)^2$

$a = 14.4 \text{ ms}^{-2}$

Consider whole system

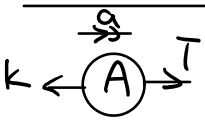
$F = ma$ (→)

$(300 + T) - (T + 2k) = (8+5) \times 14.4$ (m, a)

$300 - 2k = 187.2$

$k = \underline{\underline{56.4N}}$

60b) Consider A



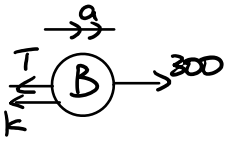
$F = ma$ (→)

$T - k = 8 \times 14.4$

$T = 115.2 + 56.4$

$T = \underline{\underline{171.6N}}$

or Consider B



$F = ma$ (→)

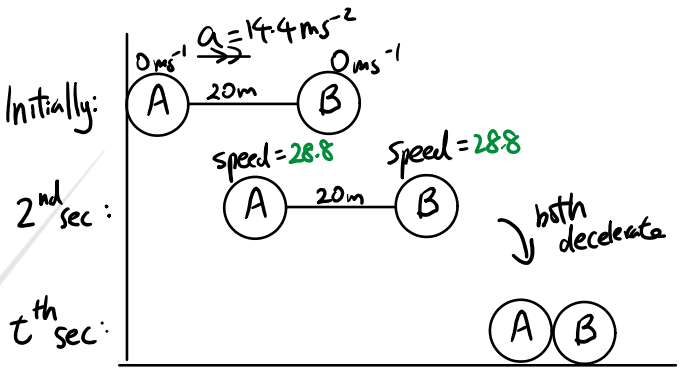
$300 - (T + k) = 5 \times 14.4$

$243.6 - T = 72$

$T = \underline{\underline{171.6N}}$

60c) The acceleration on both particles is the same.

60d)



Particle A

From initial to 2nd second:

$s = 28.8$
$u = 0$
$v = ?$
$a = 14.4$
$t = 2$

$v = u + at$

$v = 0 + 14.4(2)$

$v = 28.8 \text{ ms}^{-1}$

From 2nd second to t^{th} second:

$F = ma$ (→)

$-56.4 = 8a$

$a = -7.05 \text{ ms}^{-2}$ ← deceleration due to resistance

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$s = s_A$
$u = 28.8$
v
$a = -7.05$
$t = t$

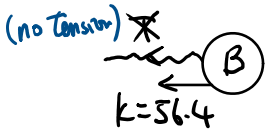
$s = ut + \frac{1}{2}at^2$

$s_A = 28.8t + \frac{1}{2}(-7.05)t^2$

$s_A = 28.8t - 3.525t^2$

Particle B

2nd second to t^{th} second:



$F = ma (\rightarrow)$

$-56.4 = 5a$

$a = -11.28\ ms^{-2}$

$s = s_B$
$u = 28.8$
v
$a = -11.28$
$t = t$

$s = ut + \frac{1}{2}at^2$

$s_B = 28.8t + \frac{1}{2}(-11.28)t^2$

$s_B = 28.8t - 5.64t^2$

If they collide, then A must have travelled 20m more than B as they were 20m apart initially.

$s_A = s_B + 20$

$28.8t - 3.525t^2 = 28.8t - 5.64t^2 + 20$

$2.115t^2 - 20 = 0$

$t = 3.075\ sec^*$

∴ A will catch up with B and collide after 3.075 seconds.

*Note: If they don't collide, you won't find a valid value of t.

List of mechanics learning videos

Chapter	Topic	Link
9.1, 9.2	Displacement-time & Velocity-time graphs	Video
9.3	Suvat formulae 1	Video
9.4	Suvat formulae 2	Video
9.5	Vertical motion under gravity	Video
10.1, 10.2	Force Diagrams and Force Vectors	Video
10.3	Forces and acceleration	Video
10.4	Motion in 2 dimensions	Video
10.5	Connected Particles	Video
10.6	Pulleys	Video
11.1	Functions of time	Video
11.2	Using differentiation	Video
11.3	Maxima and minima problems	Video
11.4	Using integration	Video
11.5	Constant acceleration formulae	Video

Learning notes can be found on:
https://bfmaths.com