Grade 11 Mechanics
Equations of Motion 3
Answers

(25). s u v a t.

30 0 180 (1)

a) $v = u + at$

$a = \frac{v-u}{t} = \frac{0-30}{180} = \underline{-0.167\ ms^{-2}}$ (1)

b) Dist $\Rightarrow$ $s = ut + 1/2\ at^2$. (1)

$= 30 \times 180 + 1/2 \times -0.167 \times 180^2$.

$= 5400 - 2705.4$

$= \underline{2695m}$ (1)

(4/)

(27). s u v a t

50. 20 50

$v^2 = u^2 + 2as$. (1)

$50^2 = 20^2 + 2 \times a \times 50$.

$a = \frac{2500 - 400}{100}$.

$= \underline{21\ cms^{-2}}$. (1)

$t = \frac{v-u}{a}$ (1)

$= \frac{50-20}{21}$

$= \underline{1.43}$ (1)

(4/).

(30) S u v a t
15 20 −10 t.

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

$15 = 20t + \frac{1}{2} \times -10t^2$.

$15 = 20t - 5t^2$.

$5t^2 - 20t + 15 = 0$. (1) or $\div 5$ $t^2 - 4t + 3 = 0$

$(t-1)(t-3) = 0$

$(5t - 5)(t - 3)$ (2)

$t = 1$ or $3s$ (1) 5/

(33) S u v a t.

0 2 10

a) $v = u + at$ (1)

$= 2 \times 10$

$= 20\ ms^{-1}$ (1)

b) $s = \frac{v^2 - u^2}{2a}$ (1)

$= \frac{400}{4}$

$= 100\ m$. (1)

c) $a = \frac{v - u}{t}$ (1)

$= \frac{0 - 20}{15}$

$= -1.3$ (1)

6/

(11)

45.

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34) s u v a t.

12 0 −10

$v^2 = u^2 + 2as$. (1)

$u^2 = v^2 - 2as$.

$= 0 - 2 \times -10 \times 12$

$u^2 = +240\ m$. (1)

$u = 15.5\ ms^{-1}$. (1)

time ⇒

$v = u + at$. (1)

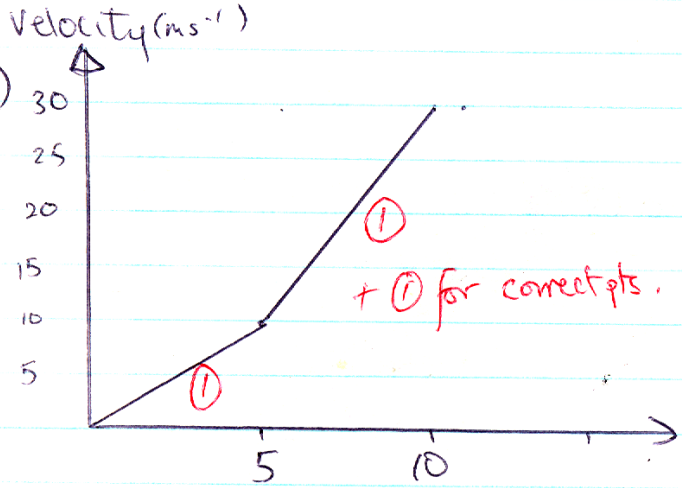
$t = \frac{v - u}{a}$.

$= \frac{-15.5 - 0}{-10}$

$= 1.55\ s$ (1)

5

35) a)



(1) (1) + (1) for correct pts.

Velocity after 5s:-

$v = u + at$

$= 0 + 2 \times 10$

$= 10\ ms^{-1}$ (1)

Velocity after 10s:-

$v = u + at$

$= 10 + 4 \times 5$

$= 10 + 20$

$= 30\ ms^{-1}$ (1)

5

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

$= \frac{1}{2} \times 2 \times 5^2$.

$= 25m$. (1)

2

36) s u v a t.

2000 10 300

$v = u + at$ (1)

$= 2000 + 10 \times 300$

$= 5000\ ms^{-1}$. (1)

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

$= 2000 \times 300 + \frac{1}{2} \times 10 \times 300^2$. (1)

$= 600000 + 450000 \Rightarrow 1050000m$

4

16

38)	s	u	v	a	t.
	11		1·5	6

$U = 40\ km/h$
$= 11\ ms^{-1}$ (1)

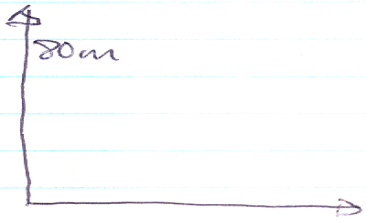
$v = u + at$ (1)
$= 11 + 1{\cdot}5 \times 6$
$= 11 + 9$
$= 20\ ms^{-1}$ (1)

If used $u = 40$
$v = 49$ 1 mark
then $s = 267$, 1 mark

OR $v^2 = u^2 + 2as$ (1)
$s = \frac{v^2 - u^2}{2a}$
$= \frac{20^2 - 11^2}{2 \times 1{\cdot}5}$
$= 93\ m$ (1)

5

40)	s	u	v	a	t.
−80	0		−10	t.



$s = ut^{0} + \frac{1}{2}at^2$ (1)
$-80 = -5t^2$
$t^2 = \frac{80}{5}$
$t^2 = 16$
$t = 4s$ (1)

Must travel 100 m in 4s.
Speed = (1) $\frac{\text{Dist}}{\text{time}} = \frac{100}{4} = 25\ ms^{-1}$ (1)
+(1) for knowing what to do.

5

25)

10