

$$F = ma$$

$$20 \sin 60^\circ = 0.2(a)$$

$$\Rightarrow a = 86.6 \text{ m/s}^2$$

c) Impulse $FAt = m\Delta v$

$$(20 \cos 60^\circ)(0.15) = 0.2(v_f - v_i)$$

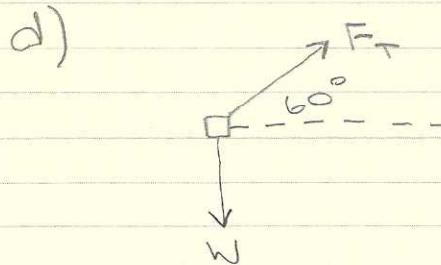
$$v_f = 7.5 \text{ m/s}$$

= launch velocity

$$\Delta s_r = (v_{sr})(t)$$

$$= (7.5)(0.15)$$

$$= 1.125 \text{ m}$$



Over

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e)

$$\text{i) } v_x = v \cos 60 \Rightarrow v = \frac{v_x}{\cos 60}$$

$$= \frac{7.5}{\cos 60}$$

$$= 15 \text{ m/s}$$

$$\text{ii) } v_x = 15 \cos 60$$

$$= 7.5 \text{ m/s}$$

$$\text{iii) } v_y = 15 \sin 60$$

$$= 12.99 \text{ m/s}$$

F)

i) See exel page

$$\text{ii) } v_f = v_i - at$$

$$0 = 12.99 - 9.81(t_A) \Rightarrow t_A = 1.32$$

$$\Rightarrow t_{\text{total}} = 2(1.32)$$

$$t_{\text{total}} = 2.65 \text{ s}$$

$$\text{iii) } y = v_y(t) + \frac{1}{2}at^2$$

$$= (12.99)(1.32) + \frac{1}{2}(9.81)(1.32)^2$$

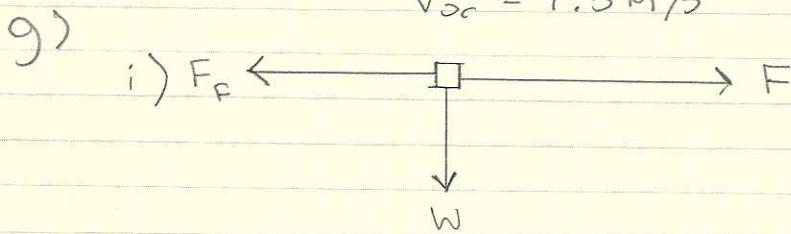
$$= 8.6 \text{ m}$$

$$\text{iv) } \Delta d_x = 7.5(2.65)$$

$$= 19.88 \text{ m}$$

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CORRESPONDENCE/NOTES

$$v_{0c} = 7.5 \text{ m/s}$$



$$\text{ii}) v_F^2 = v_i^2 + 2ad$$

$$0 = (7.5)^2 + 2(a)(3)$$

$$\Rightarrow a = -9.38 \text{ m/s}^2$$

$$\begin{aligned} F &= ma \\ &= (0.2)(9.38) \\ &= 1.88 \text{ N} \\ \Rightarrow F_F &= 1.88 \end{aligned}$$

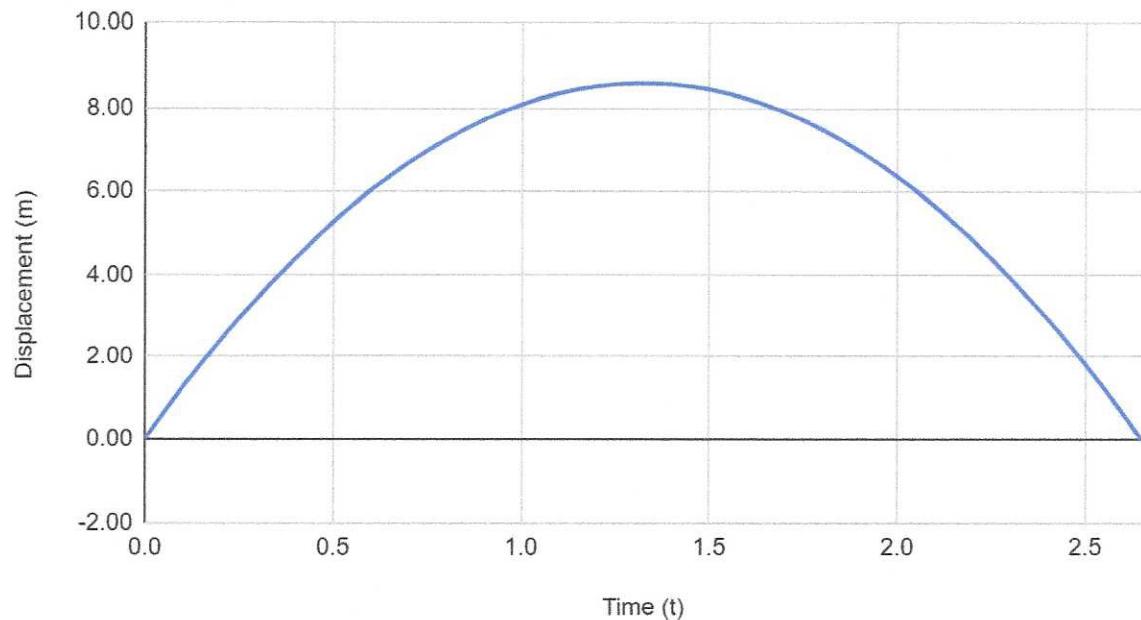
iii) $F = \mu_{\text{static}} mg$

$$1.88 = \mu_{\text{st}} (0.2)(9.81)$$

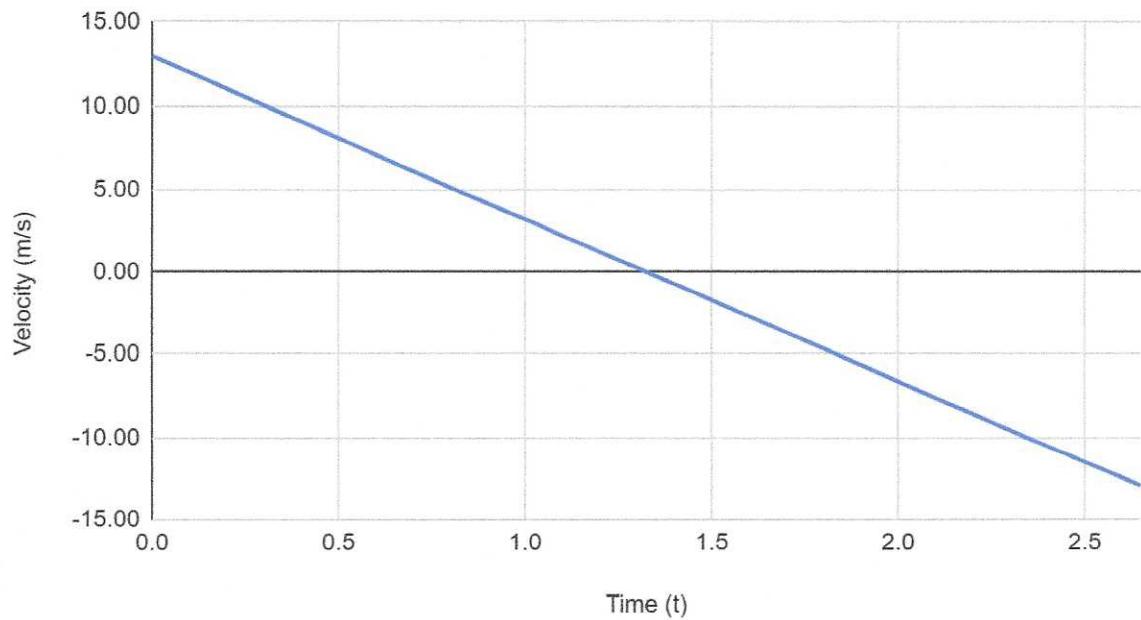
$$\Rightarrow \mu_{\text{st}} = 0.96$$

Over

Displacement (m) vs Time (t)



Velocity (m/s) vs Time (t)



Variable	Value	Unit	
Vx =	7.5	m/s	
Vy =	12.99	m/s	
Time (t)	V Displacement (m)	Velocity (m/s)	H Displacement (m)
0	0.00	12.99	0.00
0.1	1.25	12.01	0.75
0.15	1.84	11.52	1.13
0.2	2.40	11.03	1.50
0.25	2.94	10.54	1.88
0.3	3.46	10.05	2.25
0.35	3.95	9.56	2.63
0.4	4.41	9.07	3.00
0.45	4.85	8.58	3.38
0.5	5.27	8.09	3.75
0.55	5.66	7.59	4.13
0.6	6.03	7.10	4.50
0.65	6.37	6.61	4.88
0.7	6.69	6.12	5.25
0.75	6.98	5.63	5.63
0.8	7.25	5.14	6.00
0.85	7.50	4.65	6.38
0.9	7.72	4.16	6.75
0.95	7.91	3.67	7.13
1	8.09	3.18	7.50
1.05	8.23	2.69	7.88
1.1	8.35	2.20	8.25
1.15	8.45	1.71	8.63
1.2	8.52	1.22	9.00
1.25	8.57	0.73	9.38
1.3	8.60	0.24	9.75
1.35	8.60	-0.25	10.13
1.4	8.57	-0.74	10.50
1.45	8.52	-1.23	10.88
1.5	8.45	-1.73	11.25
1.55	8.35	-2.22	11.63
1.6	8.23	-2.71	12.00

1.65	8.08	-3.20	12.38
1.7	7.91	-3.69	12.75
1.75	7.71	-4.18	13.13
1.8	7.49	-4.67	13.50
1.85	7.24	-5.16	13.88
1.9	6.97	-5.65	14.25
1.95	6.68	-6.14	14.63
2	6.36	-6.63	15.00
2.05	6.02	-7.12	15.38
2.1	5.65	-7.61	15.75
2.15	5.26	-8.10	16.13
2.2	4.84	-8.59	16.50
2.25	4.40	-9.08	16.88
2.3	3.93	-9.57	17.25
2.35	3.44	-10.06	17.63
2.4	2.92	-10.55	18.00
2.45	2.38	-11.04	18.38
2.5	1.82	-11.54	18.75
2.55	1.23	-12.03	19.13
2.6	0.62	-12.52	19.50
2.65	-0.02	-13.01	19.88

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Priority
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$$P = 40 \text{ W}$$

$$V = 110 \text{ V}$$

$$t = 2 \text{ min} = 120 \text{ s}$$

$$\text{a) } P = IV$$

$$40 = I (110)$$

$$\frac{40}{110} = I$$

$$I \doteq 0.36 \text{ A}$$

$$\text{b) } R = \frac{V}{I}$$

$$R = \frac{110}{0.36}$$

$$R = 305.56 \Omega$$

$$\text{c) } Q = It$$

$$Q = (0.36) (120)$$

$$Q = 43.2 \text{ C}$$

$$\text{d) } E = P \times t$$

$$E = 40 \times 120$$

$$E = 4800 \text{ J}$$

$$Q = n |e|$$

$$\frac{Q}{|e|} = n$$

$$\frac{43.2}{1.6 \times 10^{-19}} = n$$

$$n = 2.7 \times 10^{20}$$

Over

Priority
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c) $E = P \times t$

$$P = 40 \text{ W} = 0.04 \text{ kW}$$

$$t = 2 \text{ min} = 0.03 \text{ h}$$

$$E = 0.04 (0.03)$$

$$E = 0.0012 \text{ kWh}$$

F) $\text{cost} = (\$/\text{kWh}) (\text{kWh})$

$$\text{cost} = (0.13) (0.0012)$$

$$\text{cost} = \$0.000156$$

$$\text{cost} = \$1.56 \times 10^{-5}$$