

Tuesday, November 25/14
Physics 112/111

1. Lab: The Explosion -> Due: Wednesday, Nov. 26/14
 2. Check: Multiple Choice - Momentum and Impulse } HW
Worksheet - Momentum and Impulse
-
3. ICA - Momentum, Impulse, Impulse-Momentum Theorem
- Thursday, Nov. 27/14
 4. Unit 3 - Work, Energy and Power

Explosion Lab

Observations

1. mass cart =
 - 2.
- ↓
- 1.
 - 2.

Analysis.

1. $\vec{v} = \frac{d}{t}$ } constant vel.



$d, v_i, t, v_f = ?$

2. $\vec{p} = m\vec{v}$ | $\Delta\vec{p} = m\vec{v}_f - m\vec{v}_i$

3. $\vec{F}t = m\Delta\vec{v}$
 $\vec{F}t = m(\vec{v}_f - \vec{v}_i)$
 $\vec{F} = \frac{m(\vec{v}_f - \vec{v}_i)}{t}$

$$\vec{F} = \frac{m\vec{v}_f}{t}$$

Multiple Choice - Momentum + Impulse

- | | | | |
|------|-------|-------|-------|
| 1. D | 6. B | 11. C | 16. C |
| 2. C | 7. C | 12. D | 17. C |
| 3. B | 8. A | 13. D | 18. C |
| 4. A | 9. D | 14. C | 19. D |
| 5. B | 10. C | 15. B | 20. C |

See next page for solutions to some
of the multiple choice questions.



$$\vec{J} = \vec{F}t = m\Delta\vec{v} = m\vec{v}_f - m\vec{v}_i = \vec{p}_f - \vec{p}_i = \Delta\vec{p}$$

* 6. $\vec{F} \checkmark$
 $t \checkmark$
 $\Delta\vec{p} \checkmark$
 $m\Delta\vec{v} \checkmark$
 $m(\vec{v}_f - \vec{v}_i)$

* $\vec{F}t = \Delta\vec{p}$
 $\vec{F} = \frac{\Delta\vec{p}}{t}$
time rate of change of \vec{p}

* 7. $m = 20 \text{ kg}$
 $\vec{v}_f = 0 \text{ m/s}$
 $\vec{J} = 10 \text{ N s}$

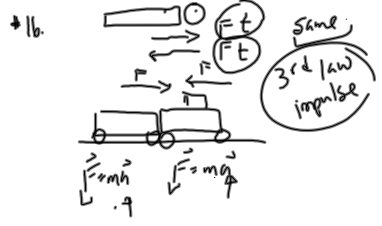
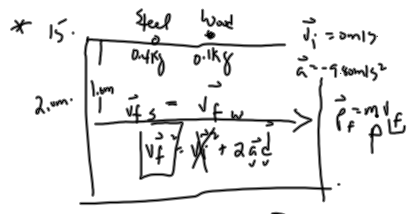
$\vec{v}_f = \frac{m\vec{v}_f - m\vec{v}_i}{m}$

* 11. $F = 10 \text{ N}$
 $t = 5 \text{ s}$
 $\vec{v}_f = 0$
 $m = 2.5 \text{ kg}$
 $\vec{v}_i = 20 \text{ m/s}$
 $\vec{J} = ?$

$\vec{J} = \vec{F}t = 50 \text{ N s}$
 $\vec{J} = m\vec{v}_f - m\vec{v}_i = -50 \text{ N s}$

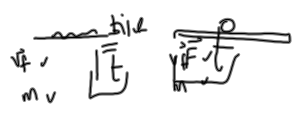
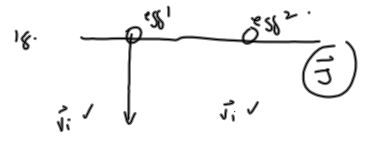
* 12. $m = 0.025 \text{ kg}$
 $\vec{F} = 200 \text{ N}$
 $t = 0.1 \text{ s}$
 $\vec{v}_i = 0 \text{ m/s}$
 $\vec{v}_f = ?$

$\vec{F}t = m\vec{v}_f - m\vec{v}_i$



* 17. $\vec{v}_i = 5.0 \times 10^{-2} \text{ m/s}$
 $\vec{v}_f = 0 \text{ m/s}$
 $\vec{J} = 5 \text{ N s}$
 $m = ?$

$\vec{J} = m\vec{v}_f - m\vec{v}_i$



$$\vec{J} = \vec{F}t = m(\vec{v}_f - \vec{v}_i)$$

Worksheet - Momentum and Impulse - Partial Key

$$* \vec{J} = \vec{I} = \vec{F}t = m \Delta \vec{v} = m(\vec{v}_f - \vec{v}_i) = m\vec{v}_f - m\vec{v}_i$$

change
in
vel.

$$= \vec{p}_f - \vec{p}_i = \Delta \vec{p}$$

1. $\vec{p} = m\vec{v}$ (a), (d)

2. Vector

3. (a)

Obj. A	Obj. B
(4 kg)(4 m/s)	(2 kg)(4 m/s)
16 kg m/s	8 kg m/s

4. $\vec{p} = m\vec{v}$
 $\vec{p} = (2.0)(-12)$ $\frac{WS}{24 kg m/s, South}$
 $\vec{p} = -24 kg m/s$

5. impulse $\vec{J} = \Delta \vec{p}$

6. a) $m = 65.8 kg$ $\vec{J} = \vec{I} = \vec{F}t$
 $\vec{F} = -1025 N$ $359 \underline{N s}, west$
 $t = 0.350 s$

b) $m = 0.168 kg$ $\vec{J} = m \Delta \vec{v}$
 $\vec{F} = +126 N$ $15.4 kg \frac{m}{s}, E.$
 $(\Delta \vec{v}) = +61.8 m/s$