Name: Key

Period: _____

Momentum In Class Review

A. $p_{1+2B} = p_{1A} + p_{2A}$ 4

B. $p_B - I = 0$ 6

C. $0 = p_{1A} + p_{2A}$ 5

D. $p_B + I = p_A$ 1

E. $p_{1B} + p_{2B} = p_{1A} + p_{2A}$ 3

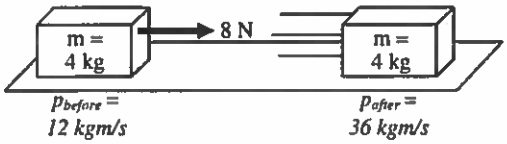
F. $p_{1B} + p_{2B} = p_{1+2A}$ 2

1. D A car speeds up.
2. F A person running catches a football.
3. E Two moving cars hit and bounce off.
4. A A moving airplane drops a bomb.
5. C A rocket at rest turns on its engine: hot gases go back; the rocket goes forward.
6. B A moving car uses its brakes to stop.

7. Which has more momentum?
   A. A fast baseball or a slow baseball?
   B. A bowling ball or a baseball with the same speed?
   C. A slow ping pong ball or a house?
8. Give two ways momentum can change.
   $= Ft$ or $m\Delta v$

9. Does a large force always cause a large impulse? Explain.
   No, if the large force only pushes a short time

10. 15 N acts for 8 seconds. How much momentum was gained?
    $\Delta p = I = Ft$
    $= 15(8)$



11. How much momentum was gained above?
    $36 - 12 = 24$ kg·m/s

12. How big is the impulse acting on the object?
    $I = \Delta p = 24$ kg·m/s

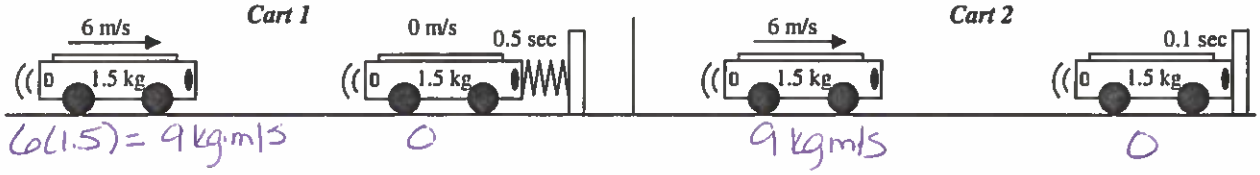
13. Calculate the time the force acted.
    $J = Ft$
    $24 = 8t$ $t = 3$ sec

14. Calculate the acceleration of the object.
    $F = ma$
    $8 = 4a$ $a = 2$ m/s

15. What is the final velocity of the object?
    $p = mv$
    $36 = 4(v)$ $v_f = 9$ m/s

16. Elastic, Inelastic, or Perfectly Inelastic (could be more than one)?
    A. I, PI $\Sigma p_{before} = \Sigma p_{after}$, $\Sigma E_{kbefore} \neq \Sigma E_{kafter}$
    B. E $\Sigma p_{before} = \Sigma p_{after}$, $\Sigma E_{kbefore} = \Sigma E_{kafter}$
    C. PI $\Sigma p_{before} = \Sigma p_{after}$, and $m_{after} = m_{1+2}$
    D. E There is little or no sound.
    E. I, PI There is a lot of noise.
    F. I, PI The objects are mangled, or crushed.

17. Two objects collide as shown above.
    A. What happens to the momentum of the 4 kg object?
    Increases
    B. What happens to the momentum of the 6 kg object?
    Decreases
    C. What happens to the total momentum of the system?
    Constant (stays same)



18. Two identical carts moving 6 m/s stop. The Cart 1 hits a spring. The Cart 2 just hits a wall.
    A. Calculate the initial momentum of the carts. 9 kg·m/s
    B. Calculate the change of momentum of the carts. -9 kg·m/s
    C. Which cart experienced the bigger change of momentum? same
    D. Which cart felt the bigger impulse? same
    E. Which cart felt the bigger force? Cart 2
    F. Calculate the force on each cart.
    $J = \Delta p = Ft$ $F = -9/.5$
    $-9 = F(.5)$ $= -18$ N
    $-9 = F(.1)$
    $F = -90$ N ← Big Force Small time
    G. So, to give the same Δp you have two choices:
    Big force small time or Small force big time

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