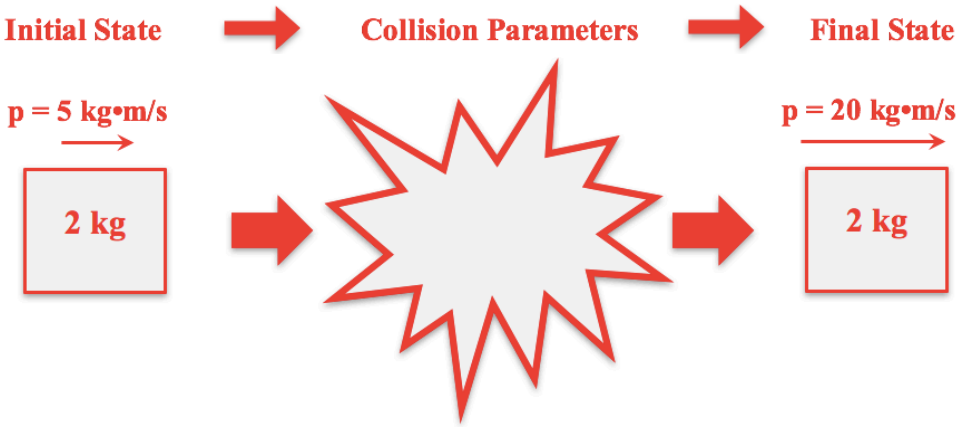
Being Impulsive About Momentum

Apprentice Difficulty Level
Question Group 1
Question 1

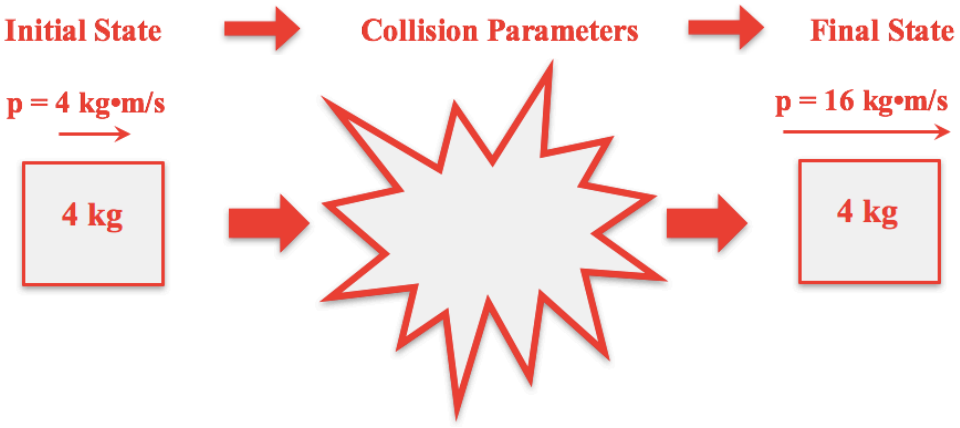
Pre- and post-collision information is shown. Identify the collision parameters that are consistent with the indicated change in momentum. (A + sign indicates a rightward direction; a - sign indicates a leftward direction.)



a. Impulse = +15 N•s
b. Impulse = +4 N•s
c. Impulse = +7.5 N•s
d. Impulse = +8 N•s
e. Impulse = +30 N•s

Question 2

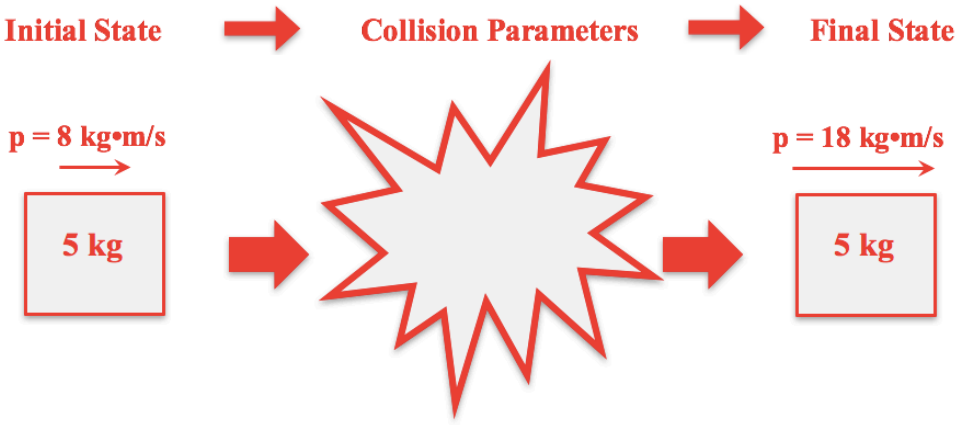
Pre- and post-collision information is shown. Identify the collision parameters that are consistent with the indicated change in momentum. (A + sign indicates a rightward direction; a - sign indicates a leftward direction.)



a. Impulse = +48 N•s
b. Impulse = +3 N•s
c. Impulse = +6 N•s
d. Impulse = +4 N•s
e. Impulse = +12 N•s

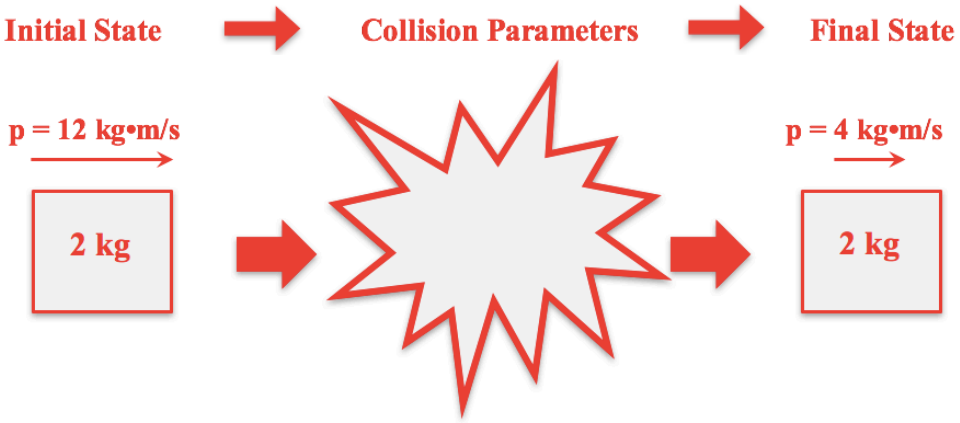
Question 3

Pre- and post-collision information is shown. Identify the collision parameters that are consistent with the indicated change in momentum. (A + sign indicates a rightward direction; a - sign indicates a leftward direction.)



a. Impulse = +10 N•s
b. Impulse = +5 N•s
c. Impulse = +3.6 N•s
d. Impulse = +2 N•s
e. Impulse = +50 N•s

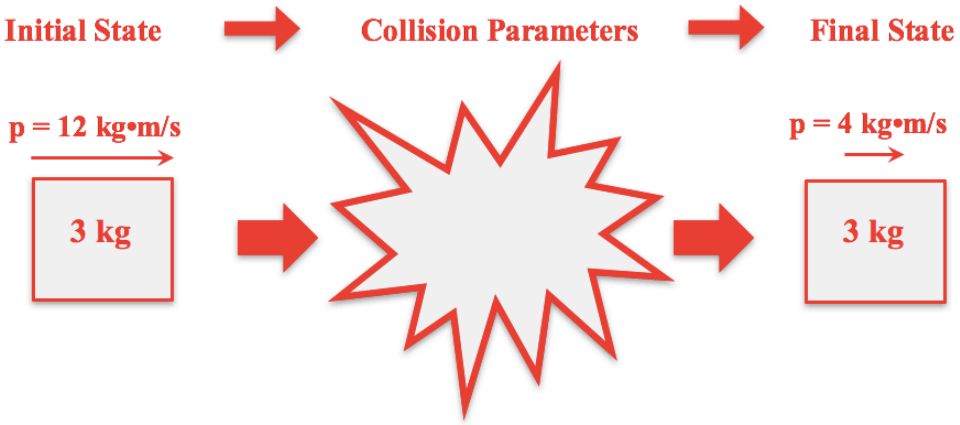
Question Group 2
Question 4
Pre- and post-collision information is shown. Identify the collision parameters that are consistent with the indicated change in momentum. (A + sign indicates a rightward direction; a - sign indicates a leftward direction.)



a. Impulse = +2 N•s
b. Impulse = -8 N•s
c. Impulse = +6 N•s
d. Impulse = -16 N•s
e. Impulse = -4 N•s

Question 5

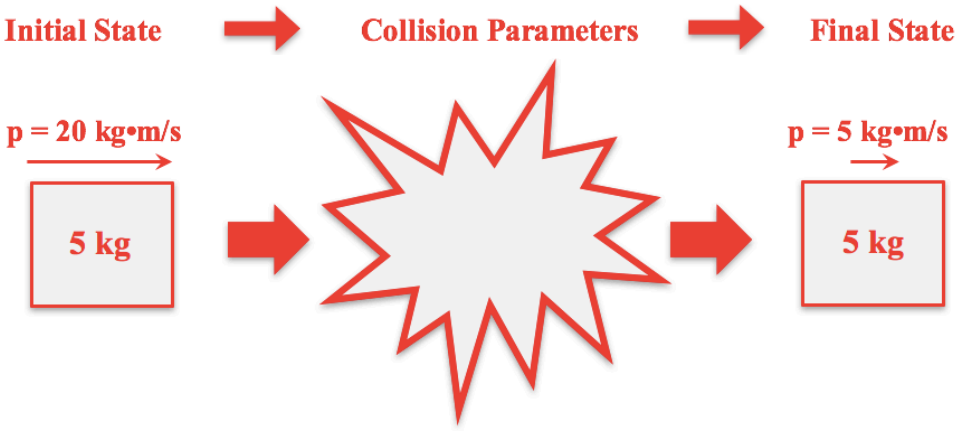
Pre- and post-collision information is shown. Identify the collision parameters that are consistent with the indicated change in momentum. (A + sign indicates a rightward direction; a - sign indicates a leftward direction.)



a. Impulse = +1.3 N•s
b. Impulse = -2.7 N•s
c. Impulse = +4 N•s
d. Impulse = -8 N•s
e. Impulse = -24 N•s

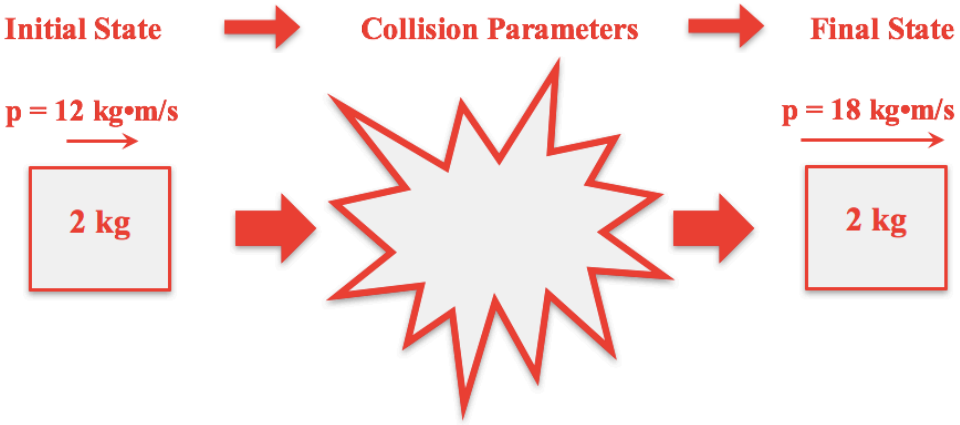
Question 6

Pre- and post-collision information is shown. Identify the collision parameters that are consistent with the indicated change in momentum. (A + sign indicates a rightward direction; a - sign indicates a leftward direction.)



a. Impulse = -15 N•s
b. Impulse = +4 N•s
c. Impulse = +1 N•s
d. Impulse = -3 N•s
e. Impulse = -75 N•s

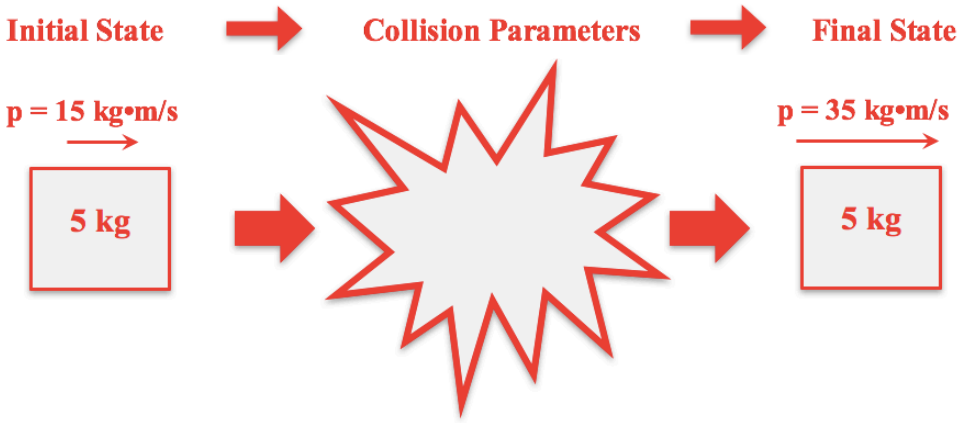
Question Group 3
Question 7
Pre- and post-collision information is shown. Identify the collision parameters that are consistent with the indicated change in momentum. (A + sign indicates a rightward direction; a - sign indicates a leftward direction.)



a. $\Delta p = +3$ kg•m/s
b. $\Delta p = +6$ kg•m/s
c. $\Delta p = +12$ kg•m/s
d. $\Delta p = +15$ kg•m/s
e. $\Delta p = +30$ kg•m/s

Question 8

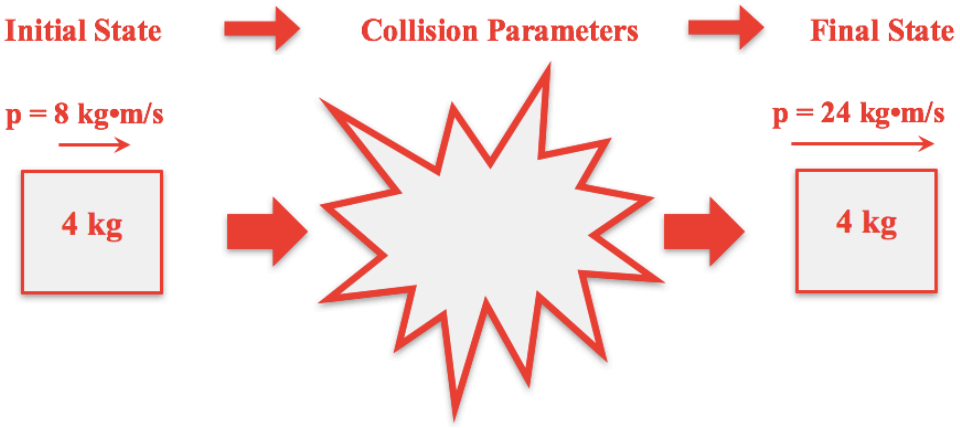
Pre- and post-collision information is shown. Identify the collision parameters that are consistent with the indicated change in momentum. (A + sign indicates a rightward direction; a - sign indicates a leftward direction.)



a. $\Delta p = +4$ kg•m/s
b. $\Delta p = +10$ kg•m/s
c. $\Delta p = +20$ kg•m/s
d. $\Delta p = +50$ kg•m/s
e. $\Delta p = +100$ kg•m/s

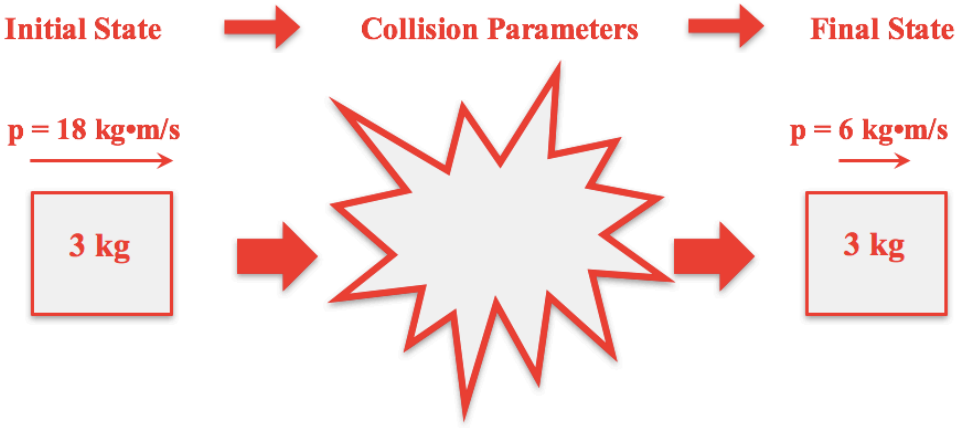
Question 9

Pre- and post-collision information is shown. Identify the collision parameters that are consistent with the indicated change in momentum. (A + sign indicates a rightward direction; a - sign indicates a leftward direction.)



a. $\Delta p = +4$ kg•m/s
b. $\Delta p = +10$ kg•m/s
c. $\Delta p = +16$ kg•m/s
d. $\Delta p = +50$ kg•m/s
e. $\Delta p = +64$ kg•m/s

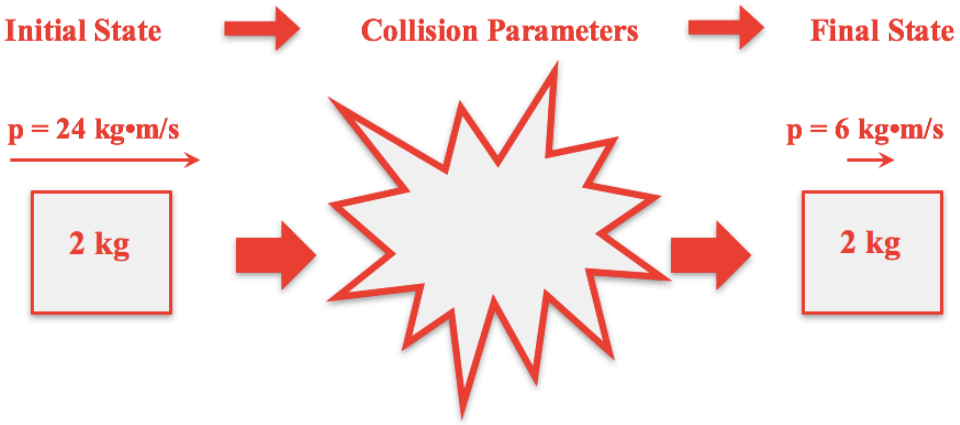
Question Group 4
Question 10
Pre- and post-collision information is shown. Identify the collision parameters that are consistent with the indicated change in momentum. (A + sign indicates a rightward direction; a - sign indicates a leftward direction.)



a. $\Delta p = -12$ kg•m/s
b. $\Delta p = -24$ kg•m/s
c. $\Delta p = -8$ kg•m/s
d. $\Delta p = -4$ kg•m/s
e. $\Delta p = -36$ kg•m/s

Question 11

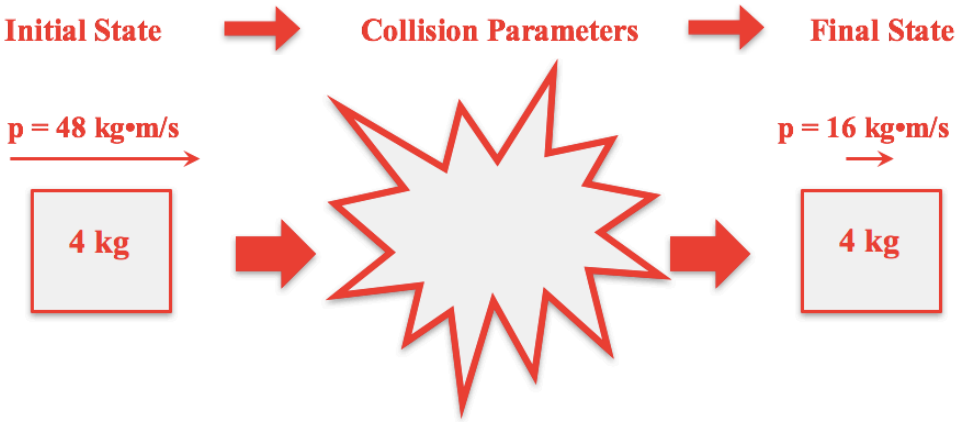
Pre- and post-collision information is shown. Identify the collision parameters that are consistent with the indicated change in momentum. (A + sign indicates a rightward direction; a - sign indicates a leftward direction.)



a. Δp = -9 kg•m/s
b. Δp = -15 kg•m/s
c. Δp = -18 kg•m/s
d. Δp = -30 kg•m/s
e. Δp = -36 kg•m/s"]

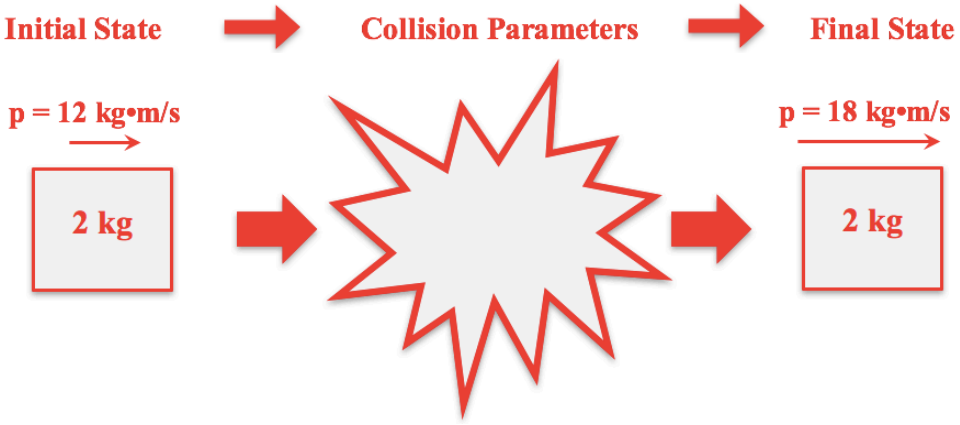
Question 12

Pre- and post-collision information is shown. Identify the collision parameters that are consistent with the indicated change in momentum. (A + sign indicates a rightward direction; a - sign indicates a leftward direction.)



a. $\Delta p = -8$ kg•m/s
b. $\Delta p = -16$ kg•m/s
c. $\Delta p = -32$ kg•m/s
d. $\Delta p = -64$ kg•m/s
e. $\Delta p = -128$ kg•m/s

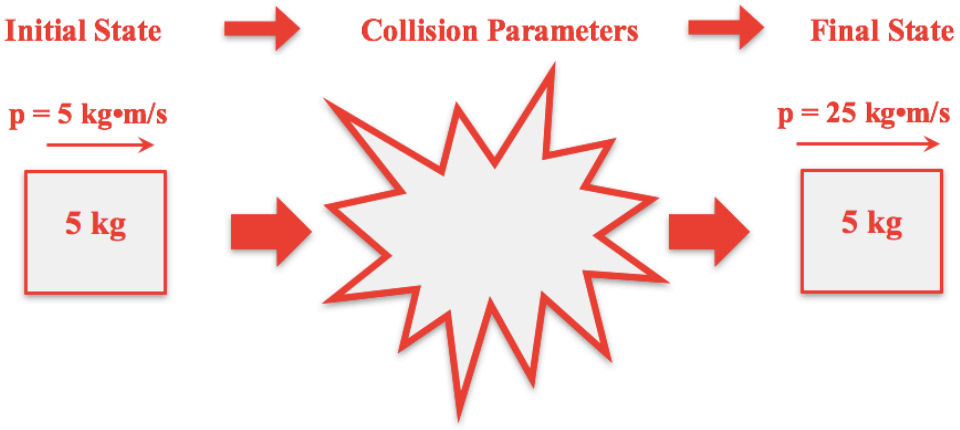
Question Group 5
Question 13
Pre- and post-collision information is shown. Identify the collision parameters that are consistent with the indicated change in momentum. (A + sign indicates a rightward direction; a - sign indicates a leftward direction.)



a. F = +2 N, Δt = 3 s
b. F = +6 N, Δt = 2 s
c. F = +9 N, Δt = 2 s
d. F = +9 N, Δt = 1 s
e. F = +3 N, Δt = 1 s

Question 14

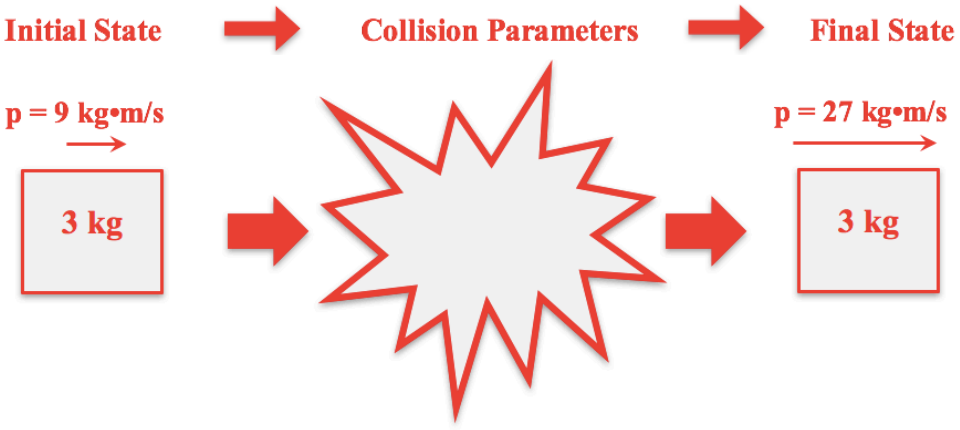
Pre- and post-collision information is shown. Identify the collision parameters that are consistent with the indicated change in momentum. (A + sign indicates a rightward direction; a - sign indicates a leftward direction.)



a. F = +10 N, Δt = 2 s
b. F = +5 N, Δt = 1 s
c. F = +1 N, Δt = 5 s
d. F = +4 N, Δt = 1 s
e. F = +20 N, Δt = 5 s

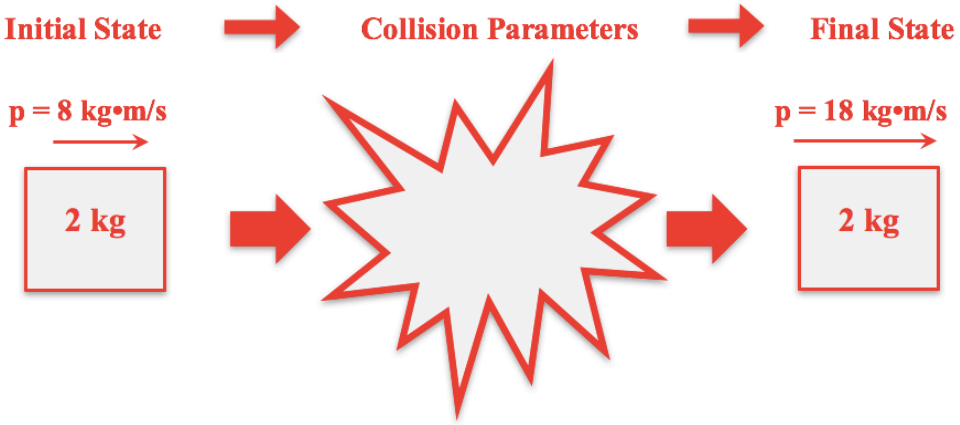
Question 15

Pre- and post-collision information is shown. Identify the collision parameters that are consistent with the indicated change in momentum. (A + sign indicates a rightward direction; a - sign indicates a leftward direction.)



a. F = +3 N, Δt = 9 s
b. F = +9 N, Δt = 2 s
c. F = +12 N, Δt = 3 s
d. F = +18 N, Δt = 6 s
e. F = +36 N, Δt = 3 s

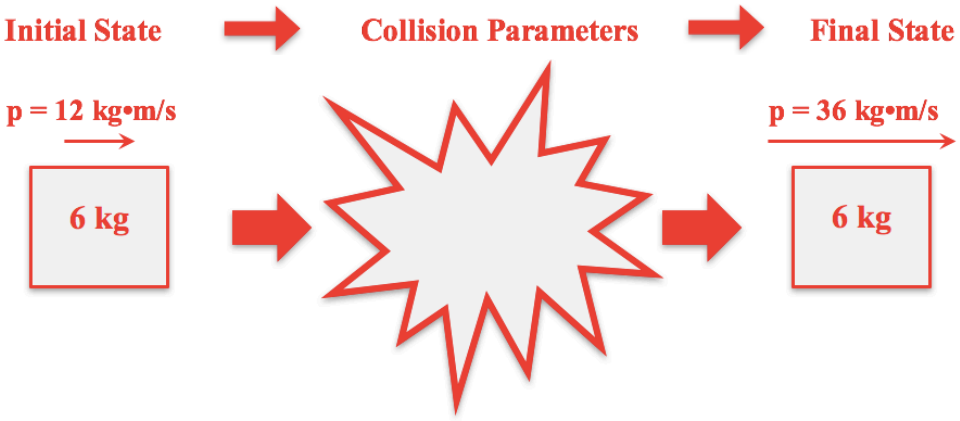
Question Group 6
Question 16
Pre- and post-collision information is shown. Identify the collision parameters that are consistent with the indicated change in momentum. (A + sign indicates a rightward direction; a - sign indicates a leftward direction.)



a. F = +2 N, Δt = 5 s
b. F = +2 N, Δt = 10 s
c. F = +5 N, Δt = 1 s
d. F = +10 N, Δt = 2 s
e. F = +13 N, Δt = 2 s

Question 17

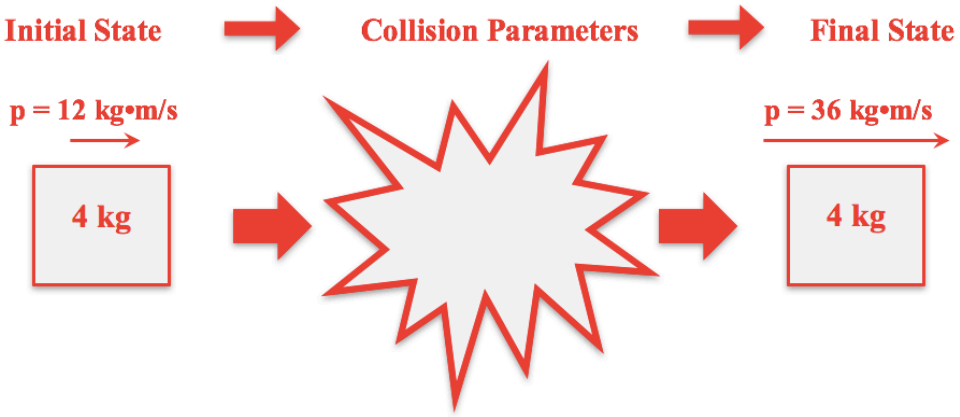
Pre- and post-collision information is shown. Identify the collision parameters that are consistent with the indicated change in momentum. (A + sign indicates a rightward direction; a - sign indicates a leftward direction.)



a. F = +1 N, Δt = 4 s
b. F = +2 N, Δt = 6 s
c. F = +3 N, Δt = 2 s
d. F = +8 , Δt = 6 s
e. F = +12 N, Δt = 2 s

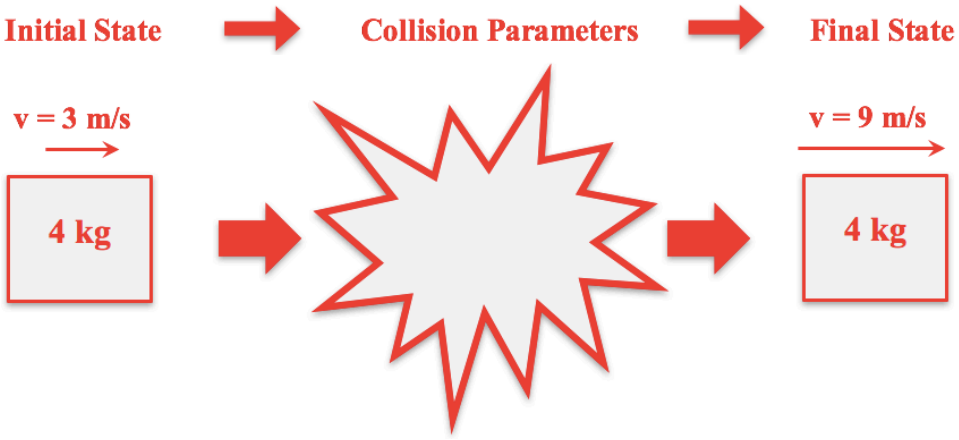
Question 18

Pre- and post-collision information is shown. Identify the collision parameters that are consistent with the indicated change in momentum. (A + sign indicates a rightward direction; a - sign indicates a leftward direction.)



a. F = +3 N, Δt = 12 s
b. F = +6 N, Δt = 4 s
c. F = +12 N, Δt = 4 s
d. F = +24 N, Δt = 4 s
e. F = +24 N, Δt = 6 s

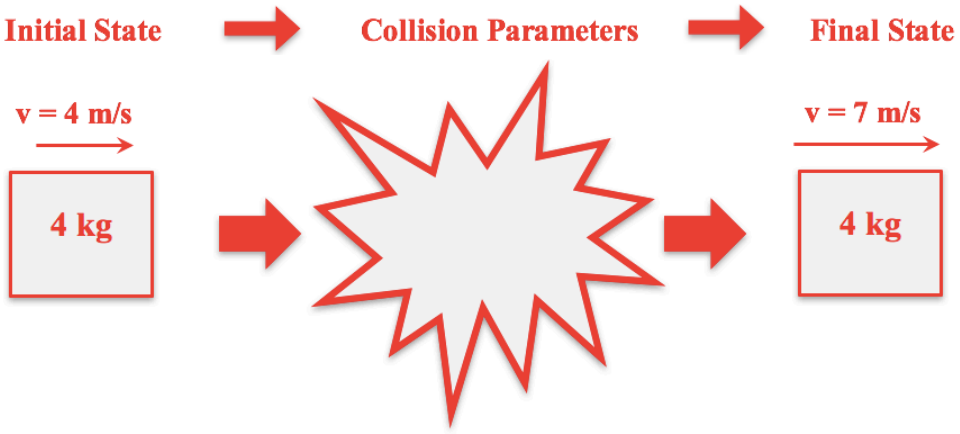
Master Difficulty Level
Question Group 7
Question 19
Pre- and post-collision information is shown. Identify the collision parameters that are consistent with the indicated change in momentum. (A + sign indicates a rightward direction; a - sign indicates a leftward direction.)



a. Impulse = +12 N•s
b. Impulse = +24 N•s
c. $\Delta p = +6$ kg•m/s
d. $F = +6$ N, $\Delta t = 2$ s
e. $F = +24$ N, $\Delta t = 4$

Question 20

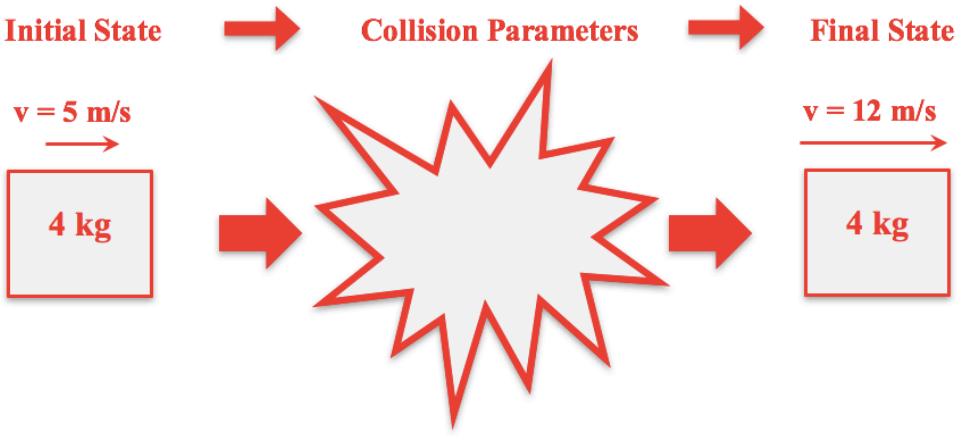
Pre- and post-collision information is shown. Identify the collision parameters that are consistent with the indicated change in momentum. (A + sign indicates a rightward direction; a - sign indicates a leftward direction.)



a. Impulse = +11 N•s
b. Impulse = +12 N•s
c. $\Delta p = +3$ kg•m/s
d. $F = +3$ N, $\Delta t = 3$ s
e. $F = +12$ N, $\Delta t = 4$ s

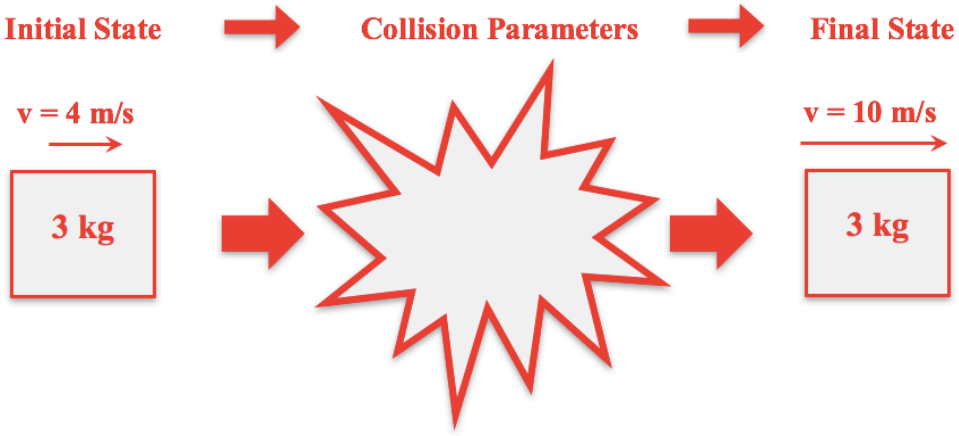
Question 21

Pre- and post-collision information is shown. Identify the collision parameters that are consistent with the indicated change in momentum. (A + sign indicates a rightward direction; a - sign indicates a leftward direction.)



a. F = +7 N, Δt = 2 s
b. F = +28 N, Δt = 4 s
c. Impulse = +17 N•s
d. Impulse = +28 N•s
e. Δp = +7 kg•m/s

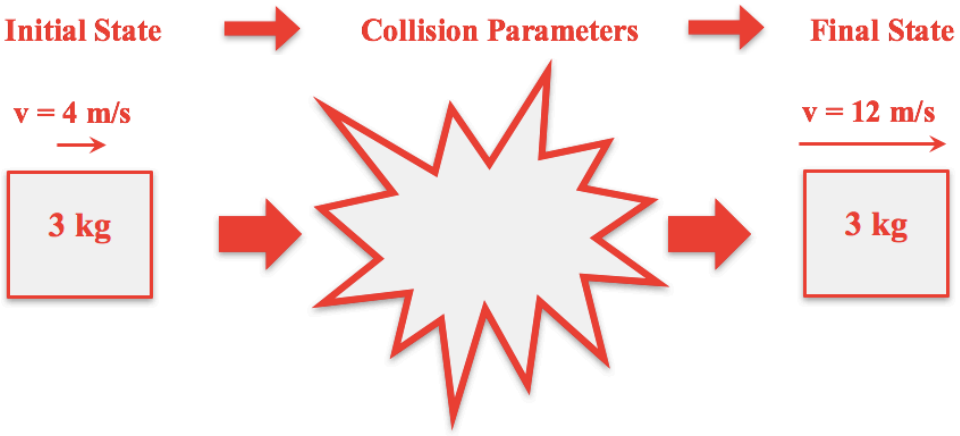
Question Group 8
Question 22
Pre- and post-collision information is shown. Identify the collision parameters that are consistent with the indicated change in momentum. (A + sign indicates a rightward direction; a - sign indicates a leftward direction.)



a. Impulse = +14 N•s
b. Impulse = +18 N•s
c. $\Delta p = +42$ kg•m/s
d. $F = +18$ N, $\Delta t = 3$ s
e. $F = +40$ N, $\Delta t = 3$ s

Question 23

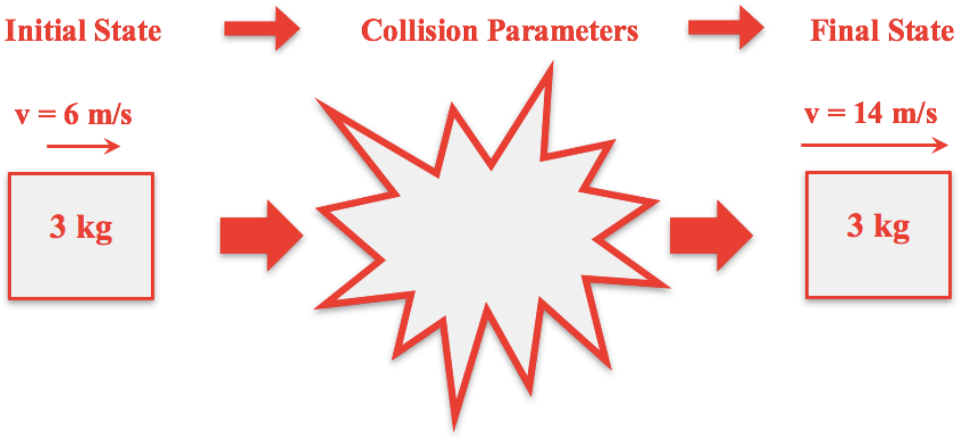
Pre- and post-collision information is shown. Identify the collision parameters that are consistent with the indicated change in momentum. (A + sign indicates a rightward direction; a - sign indicates a leftward direction.)



a. $\Delta p = +48$ kg•m/s
b. Impulse = +16 N•s
c. Impulse = +24 N•s
d. F = +24 N, $\Delta t = 3$ s
e. F = +48 N, $\Delta t = 3$ s

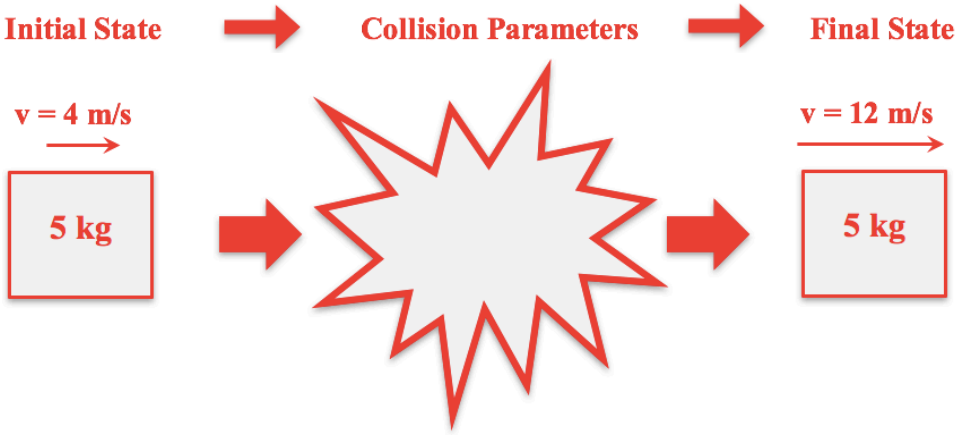
Question 24

Pre- and post-collision information is shown. Identify the collision parameters that are consistent with the indicated change in momentum. (A + sign indicates a rightward direction; a - sign indicates a leftward direction.)



a. $\Delta p = +60$ kg•m/s
b. Impulse = +20 N•s
c. Impulse = +24 N•s
d. F = +20 N, $\Delta t = 3$ s
e. F = +24 N, $\Delta t = 3$ s

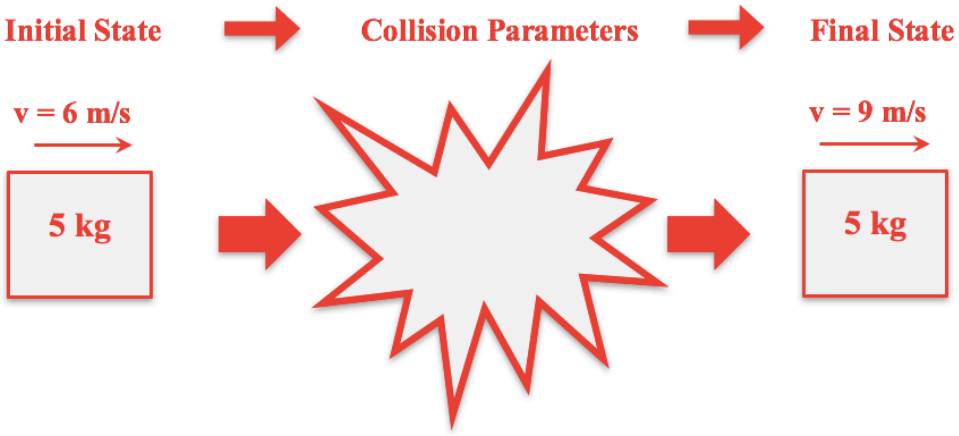
Question Group 9
Question 25
Pre- and post-collision information is shown. Identify the collision parameters that are consistent with the indicated change in momentum. (A + sign indicates a rightward direction; a - sign indicates a leftward direction.)



a. $\Delta p = +40$ kg•m/s
b. $\Delta p = +8$ kg•m/s
c. Impulse = +16 N•s
d. $F = +12$ N, $\Delta t = 4$ s
e. $F = +60$ N, $\Delta t = 3.0$ s

Question 26

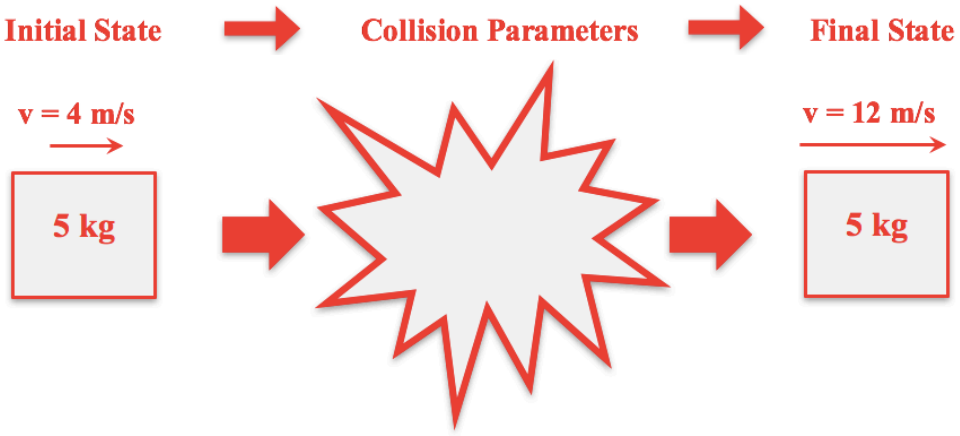
Pre- and post-collision information is shown. Identify the collision parameters that are consistent with the indicated change in momentum. (A + sign indicates a rightward direction; a - sign indicates a leftward direction.)



a. F = +9 N, Δt = 6 s
b. F = +45 N, Δt = 1.5 s
c. Δp = +15 kg•m/s
d. Δp = +3 kg•m/s
e. Impulse = +15 N•s

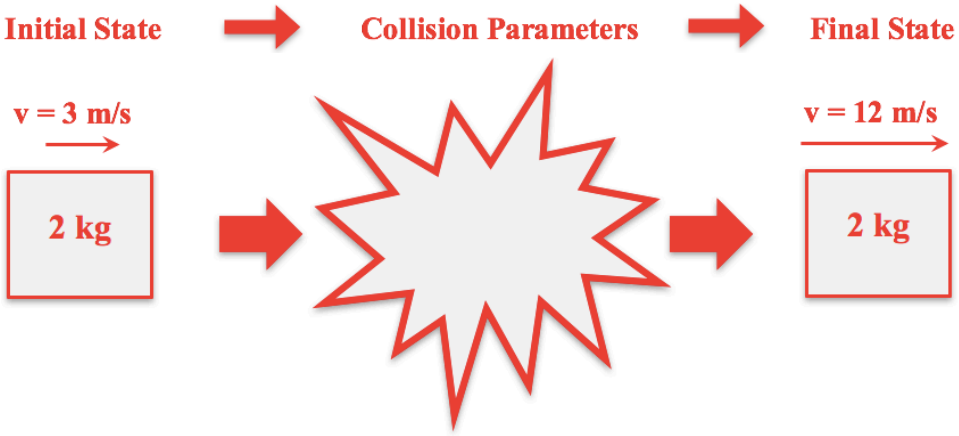
Question 27

Pre- and post-collision information is shown. Identify the collision parameters that are consistent with the indicated change in momentum. (A + sign indicates a rightward direction; a - sign indicates a leftward direction.)



a. F = +12 N, Δt = 4 s
b. F = +60 N, Δt = 3.0 s
c. Δp = +40 kg•m/s
d. Δp = +8 kg•m/s
e. Impulse = +16 N•s

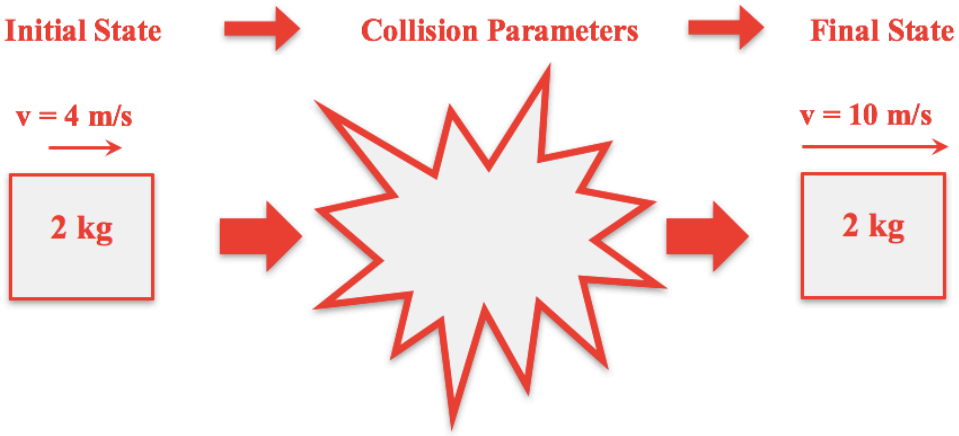
Question Group 10
Question 28
Pre- and post-collision information is shown. Identify the collision parameters that are consistent with the indicated change in momentum. (A + sign indicates a rightward direction; a - sign indicates a leftward direction.)



a. $\Delta p = +18$ kg•m/s
b. $\Delta p = +30$ kg•m/s
c. $F = +9$ N, $\Delta t = 1$ s
d. Impulse = +9 kg•m/s
e. Impulse = +24 kg•m/s

Question 29

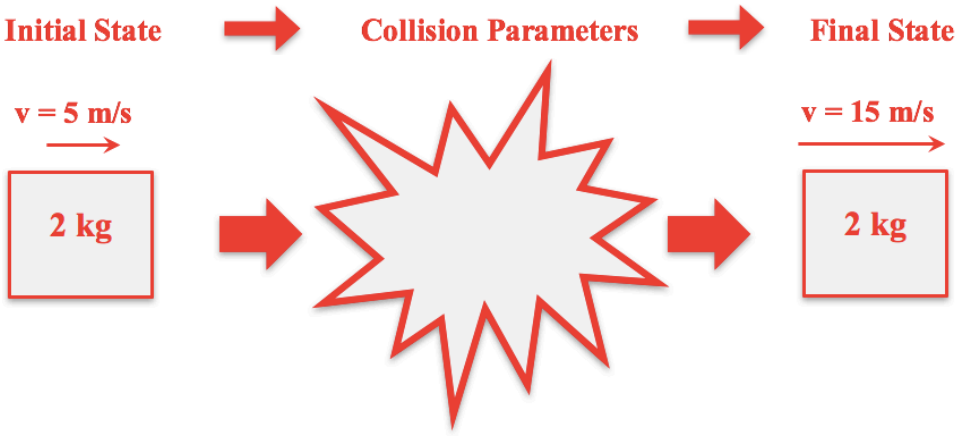
Pre- and post-collision information is shown. Identify the collision parameters that are consistent with the indicated change in momentum. (A + sign indicates a rightward direction; a - sign indicates a leftward direction.)



a. F = +6 N, Δt = 1 s
b. Δp = +12 kg•m/s
c. Δp = +28 kg•m/s
d. Impulse = +6 kg•m/s
e. Impulse = +20 kg•m/s

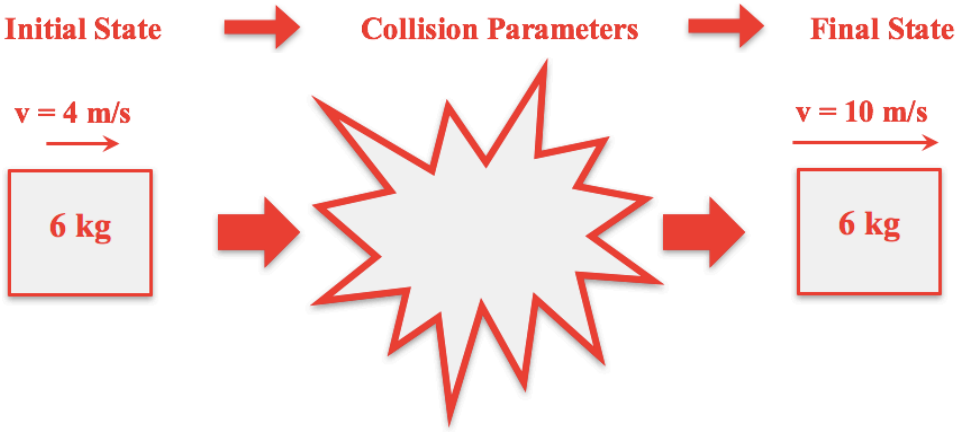
Question 30

Pre- and post-collision information is shown. Identify the collision parameters that are consistent with the indicated change in momentum. (A + sign indicates a rightward direction; a - sign indicates a leftward direction.)



a. F = +10 N, Δt = 1 s
b. Impulse = +10 kg•m/s
c. Impulse = +30 kg•m/s
d. Δp = +20 kg•m/s
e. Δp = +40 kg•m/s

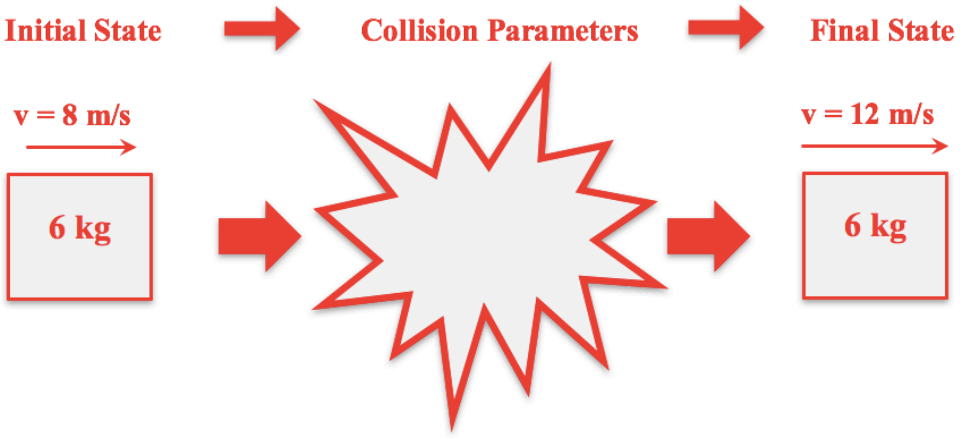
Question Group 11
Question 31
Pre- and post-collision information is shown. Identify the collision parameters that are consistent with the indicated change in momentum. (A + sign indicates a rightward direction; a - sign indicates a leftward direction.)



a. F = +18 N, Δt = 2 s
b. F = +6 N, Δt = 1 s
c. Impulse = +1 N•s
d. Impulse = + 6 N•s
e. Δp = +14 kg•m/s

Question 32

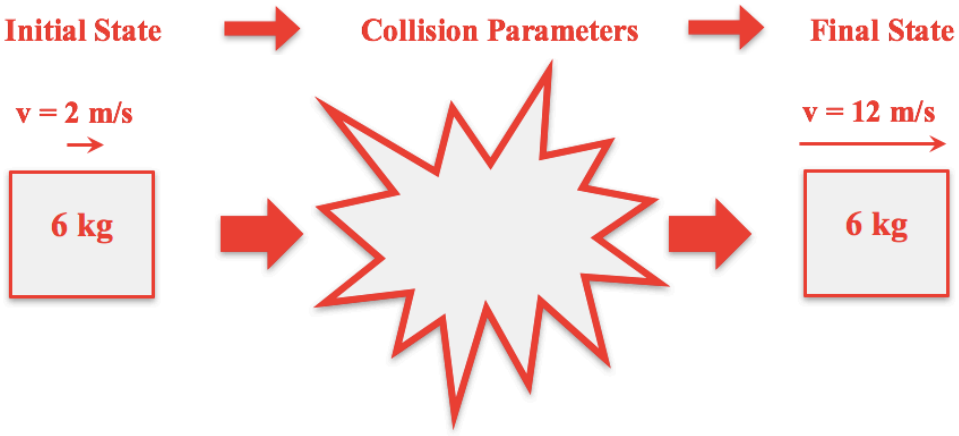
Pre- and post-collision information is shown. Identify the collision parameters that are consistent with the indicated change in momentum. (A + sign indicates a rightward direction; a - sign indicates a leftward direction.)



a. Impulse = + 4 N•s
b. Impulse = +0.67 N•s
c. Δp = +20 kg•m/s
d. F = +12 N, Δt = 2 s
e. F = +4 N, Δt = 1.5 s

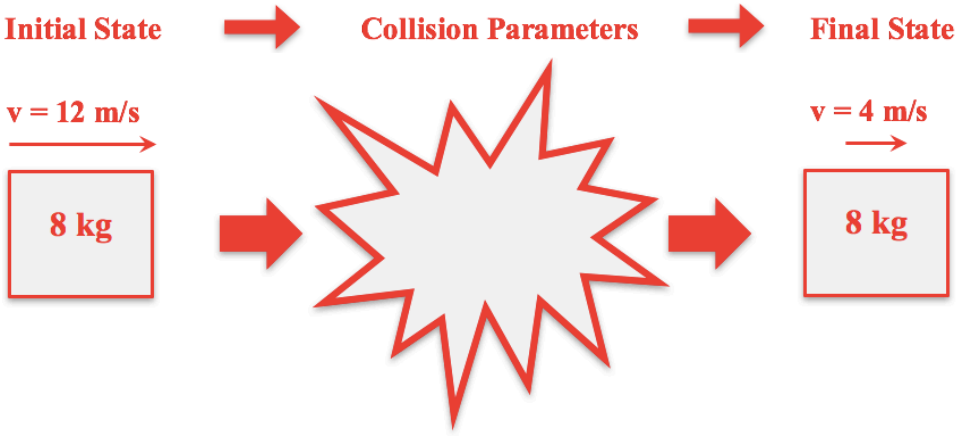
Question 33

Pre- and post-collision information is shown. Identify the collision parameters that are consistent with the indicated change in momentum. (A + sign indicates a rightward direction; a - sign indicates a leftward direction.)



a. F = +30 N, Δt = 2 s
b. F = +10 N, Δt = 2 s
c. Impulse = + 10 N•s
d. Impulse = +1.67 N•s
e. Δp = +14 kg•m/s

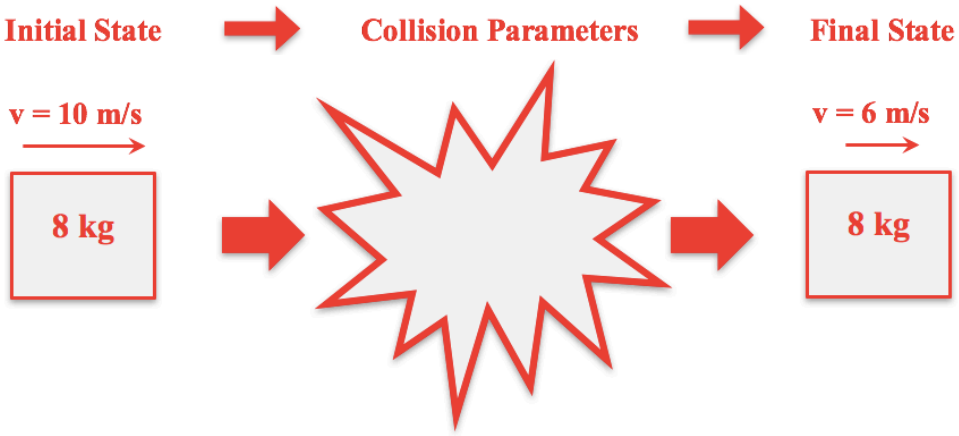
Question Group 12
Question 34
Pre- and post-collision information is shown. Identify the collision parameters that are consistent with the indicated change in momentum. (A + sign indicates a rightward direction; a - sign indicates a leftward direction.)



a. F = -32 N, Δt = 2 s
b. F = -16 N, Δt = 2 s
c. Impulse = -48 N•s
d. Δp = -8 kg•m/s
e. Δp = -8 kg•m/s

Question 35

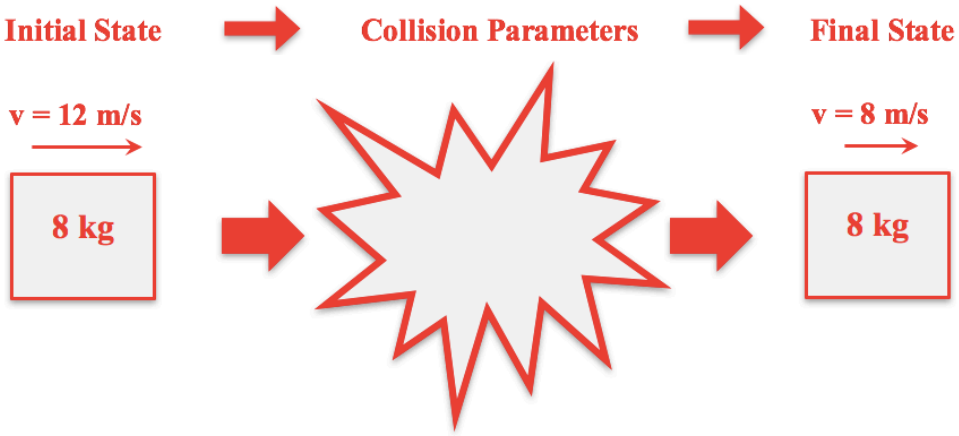
Pre- and post-collision information is shown. Identify the collision parameters that are consistent with the indicated change in momentum. (A + sign indicates a rightward direction; a - sign indicates a leftward direction.)



a. $\Delta p = -4$ kg•m/s
b. $\Delta p = -16$ kg•m/s
c. $F = -16$ N, $\Delta t = 2$ s
d. $F = -16$ N, $\Delta t = 1$ s
e. Impulse = -64 N•s

Question 36

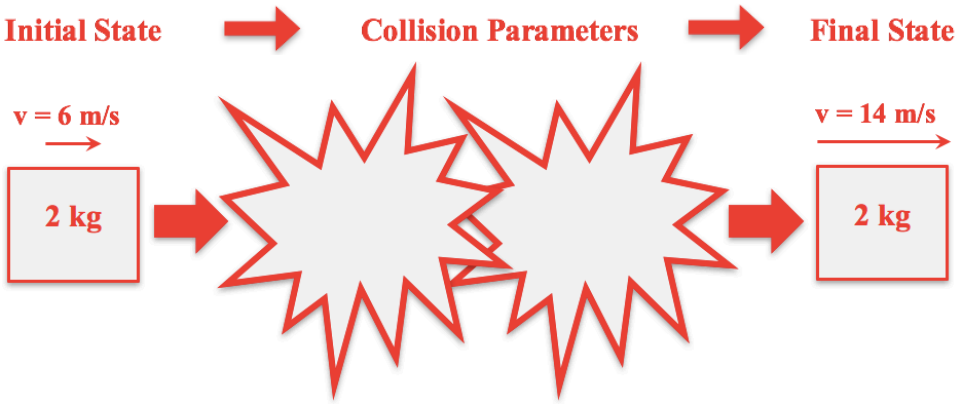
Pre- and post-collision information is shown. Identify the collision parameters that are consistent with the indicated change in momentum. (A + sign indicates a rightward direction; a - sign indicates a leftward direction.)



a. Impulse = -80 N•s
b. Δp = -4 kg•m/s
c. Δp =-20 kg•m/s
d. F = -16 N, Δt = 2 s
e. F = -32 N, Δt = 2 s

Wizard Difficulty Level
Question Group 13
Question 37

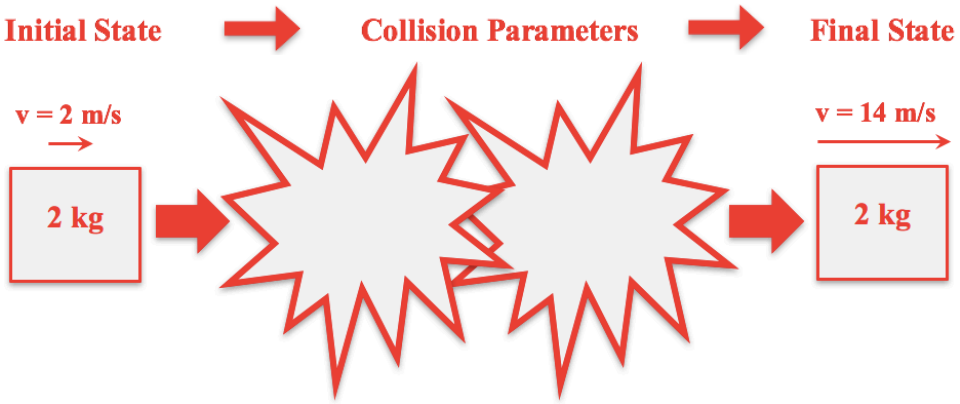
For the given pre- and post-collision information, identify the collision parameters that are consistent with the indicated momentum change. Pick two sets of parameters. (A + sign indicates a rightward direction; a - sign indicates a leftward direction.)



a. Impulse = +8 N•s
b. Impulse = -8 N•s
c. F = +4 N, Δt = 2 s
d. Δp = +24 kg•m/s
e. F = + 32 N, Δt = 0.5 s

Question 38

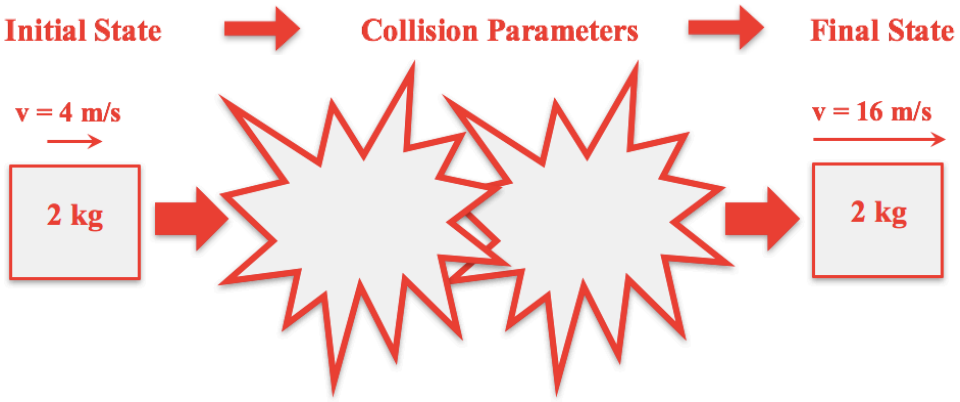
For the given pre- and post-collision information, identify the collision parameters that are consistent with the indicated momentum change. Pick two sets of parameters. (A + sign indicates a rightward direction; a - sign indicates a leftward direction.)



a. $\Delta p = +32$ kg•m/s
b. Impulse = +18 N•s
c. Impulse = -8 N•s
d. F = + 6 N, $\Delta t = 2$ s
e. F = +48 N, $\Delta t = 0.5$ s

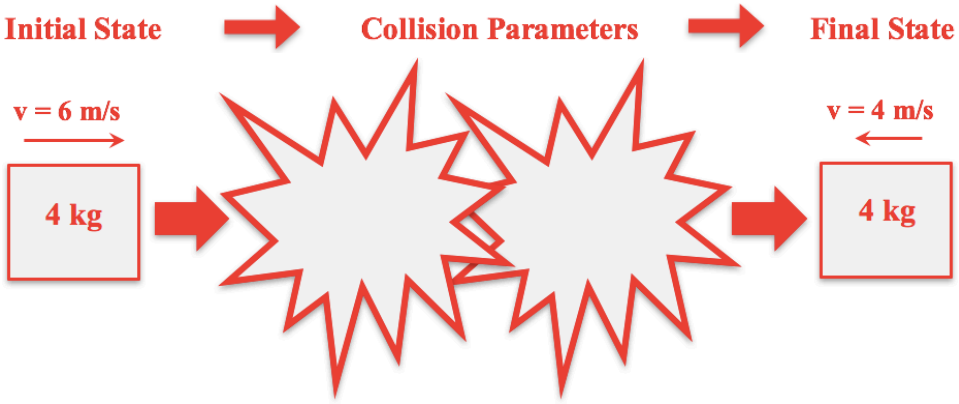
Question 39

For the given pre- and post-collision information, identify the collision parameters that are consistent with the indicated momentum change. Pick two sets of parameters. (A + sign indicates a rightward direction; a - sign indicates a leftward direction.)



a. $\Delta p = +32$ kg•m/s
b. Impulse = +8 N•s
c. Impulse = -8 N•s
d. F = + 48 N, $\Delta t = 0.5$ s
e. F = +4 N, $\Delta t = 2$ s

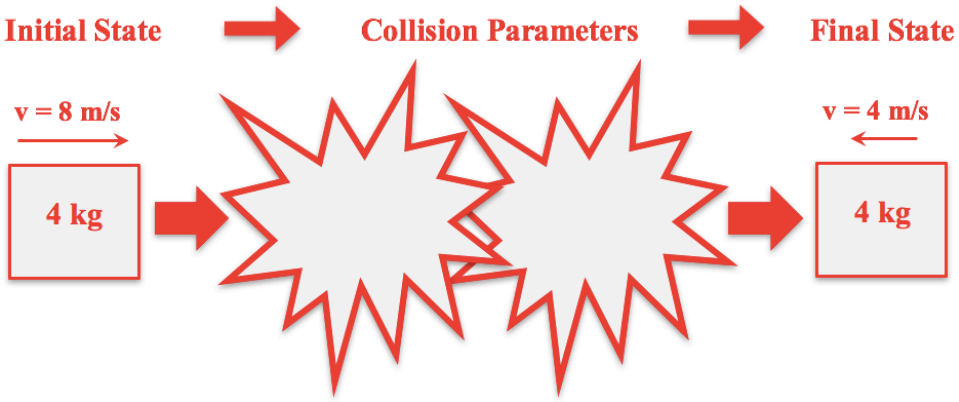
Question Group 14
Question 40
For the given pre- and post-collision information, identify the collision parameters that are consistent with the indicated momentum change. Pick two sets of parameters. (A + sign indicates a rightward direction; a - sign indicates a leftward direction.)



a. F = +8 N, Δt = 1 s
b. F = +16 N, Δt = 2 s
c. Δp = -8 kg•m/s
d. Δp = -48 kg•m/s
e. Impulse = -40 N•s

Question 41

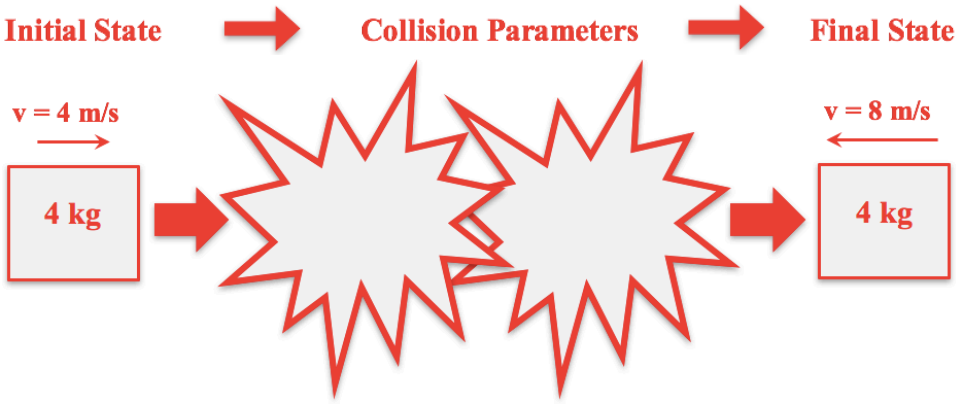
For the given pre- and post-collision information, identify the collision parameters that are consistent with the indicated momentum change. Pick two sets of parameters. (A + sign indicates a rightward direction; a - sign indicates a leftward direction.)



a. Impulse = -48 N•s
b. F = +12 N, Δt = 1 s
c. F = +14 N, Δt = 2 s
d. Δp = -28 kg•m/s
e. Δp = -60 kg•m/s

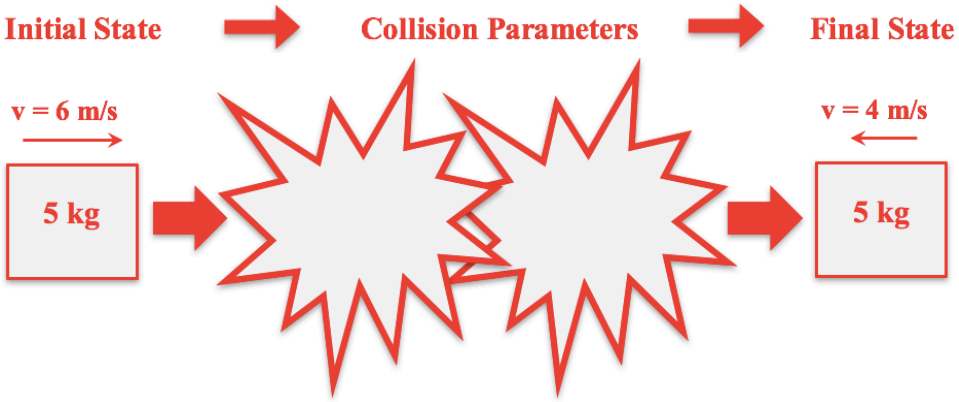
Question 42

For the given pre- and post-collision information, identify the collision parameters that are consistent with the indicated momentum change. Pick two sets of parameters. (A + sign indicates a rightward direction; a - sign indicates a leftward direction.)



F = +8 N, Δt = 1 s
Δp = -48 kg•m/s
Δp = -8 kg•m/s
F = +16 N, Δt = 2 s
Impulse = -40 N•s

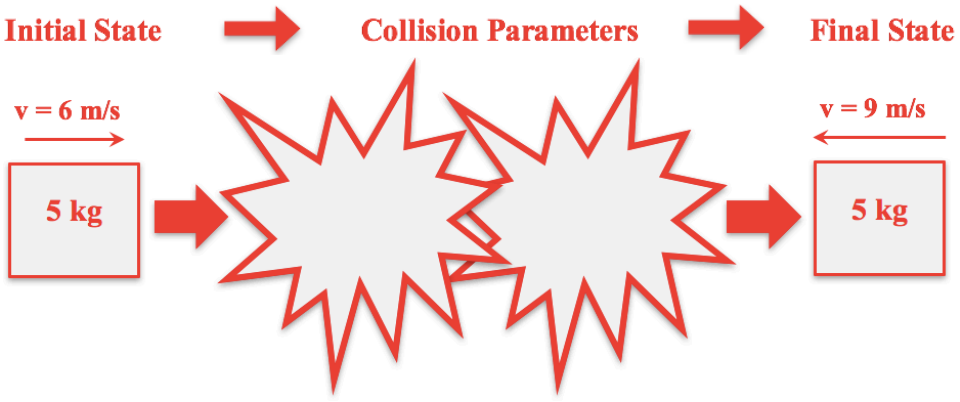
Question Group 15
Question 43
For the given pre- and post-collision information, identify the collision parameters that are consistent with the indicated momentum change. Pick two sets of parameters. (A + sign indicates a rightward direction; a - sign indicates a leftward direction.)



a. $\Delta p = +60$ kg•m/s
b. $F = +5$ N, $\Delta t = 2$ s
c. $F = +20$ N, $\Delta t = 2$ s
d. Impulse = -60 N•s
e. Impulse = -50 N•s

Question 44

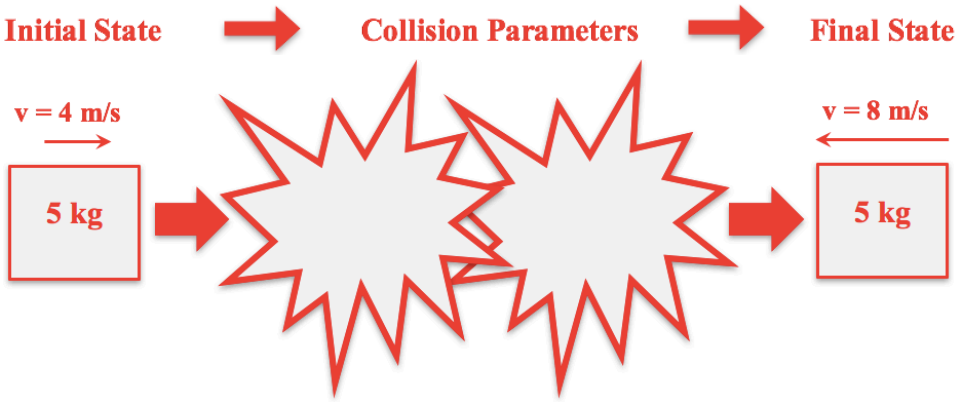
For the given pre- and post-collision information, identify the collision parameters that are consistent with the indicated momentum change. Pick two sets of parameters. (A + sign indicates a rightward direction; a - sign indicates a leftward direction.)



a. Impulse = -90 N•s
b. Impulse = -75 N•s
c. Δp = +60 kg•m/s
d. F = +5 N, Δt = 3 s
e. F = +90 N, Δt = 0.5 s

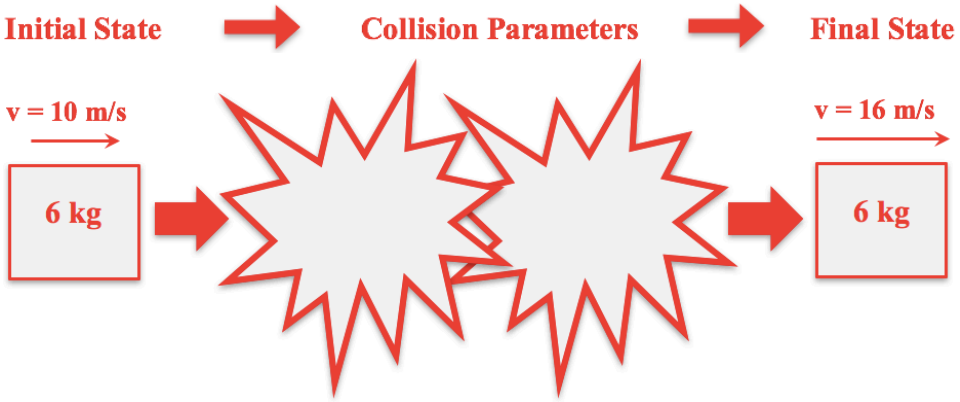
Question 45

For the given pre- and post-collision information, identify the collision parameters that are consistent with the indicated momentum change. Pick two sets of parameters. (A + sign indicates a rightward direction; a - sign indicates a leftward direction.)



a. F = +15 N, Δt = 2 s
b. Impulse = -90 N•s
c. Δp = +30 kg•m/s
d. F = +20 N, Δt = 1 s
e. Impulse = -60 N•s"]

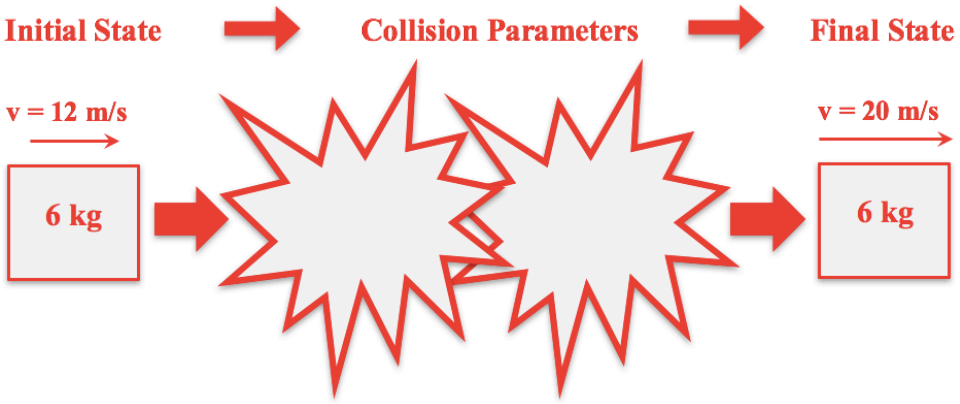
Question Group 16
Question 46
For the given pre- and post-collision information, identify the collision parameters that are consistent with the indicated momentum change. Pick two sets of parameters. (A + sign indicates a rightward direction; a - sign indicates a leftward direction.)



a. F = +12 N, Δt = 1 s
b. F = +48 N, Δt = 0.5 s
c. F = +24 N, Δt = 2 s
d. Impulse = -12 N•s
e. Δp = +108 kg•m/s

Question 47

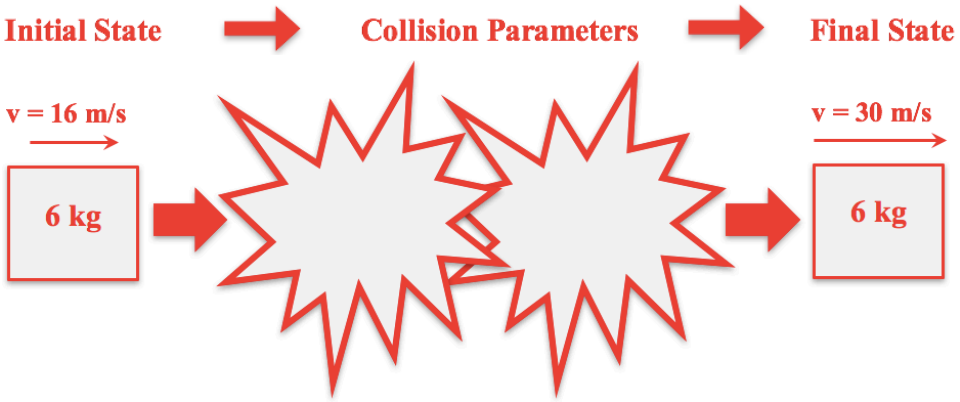
For the given pre- and post-collision information, identify the collision parameters that are consistent with the indicated momentum change. Pick two sets of parameters. (A + sign indicates a rightward direction; a - sign indicates a leftward direction.)



a. F = +36 N, Δt = 2 s
b. F = +12 N, Δt = 1 s
c. F = +24 N, Δt = 2 s
d. Impulse = -24 N•s
e. Δp = +120 kg•m/s

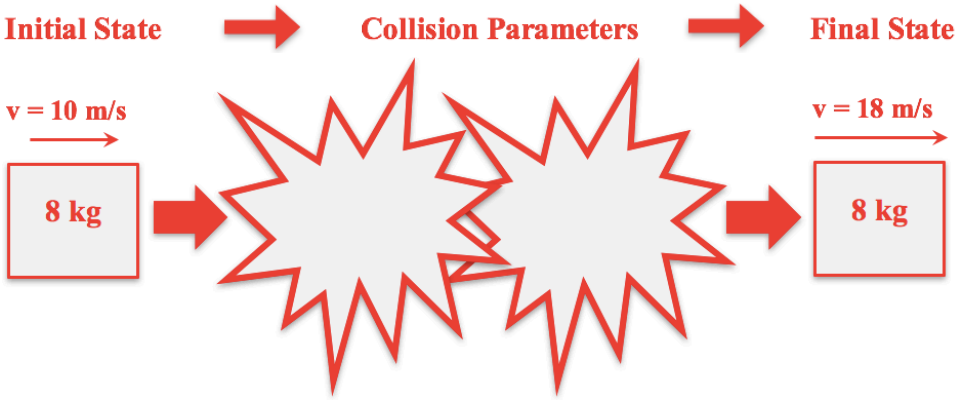
Question 48

For the given pre- and post-collision information, identify the collision parameters that are consistent with the indicated momentum change. Pick two sets of parameters. (A + sign indicates a rightward direction; a - sign indicates a leftward direction.)



a. Impulse = +12 N•s
b. Δp = +48 kg•m/s
c. F = +36 N, Δt = 2 s
d. F = -12 N, Δt = 2 s
e. F = +96 N, Δt = 0.5 s

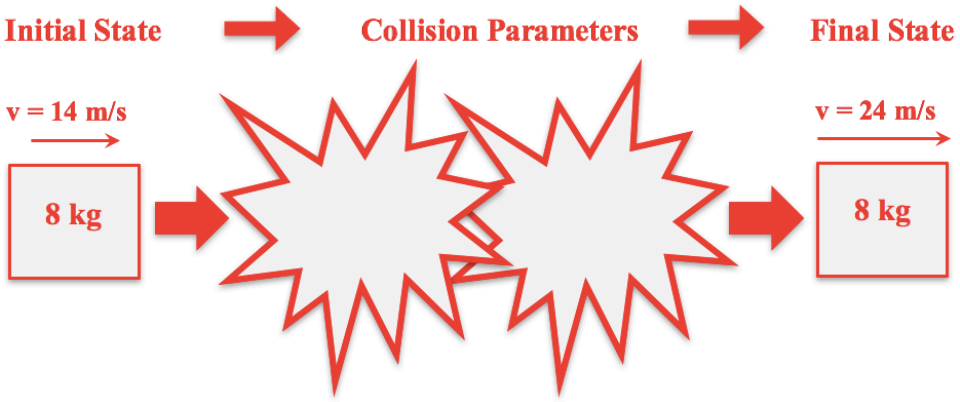
Question Group 17
Question 49
For the given pre- and post-collision information, identify the collision parameters that are consistent with the indicated momentum change. Pick two sets of parameters. (A + sign indicates a rightward direction; a - sign indicates a leftward direction.)



a. $\Delta p = +48$ kg•m/s
b. $\Delta p = +32$ kg•m/s
c. $F = +45$ N, $\Delta t = 4$ s
d. $F = 32$ N, $\Delta t = 0.5$ s
e. Impulse 32 N•s

Question 50

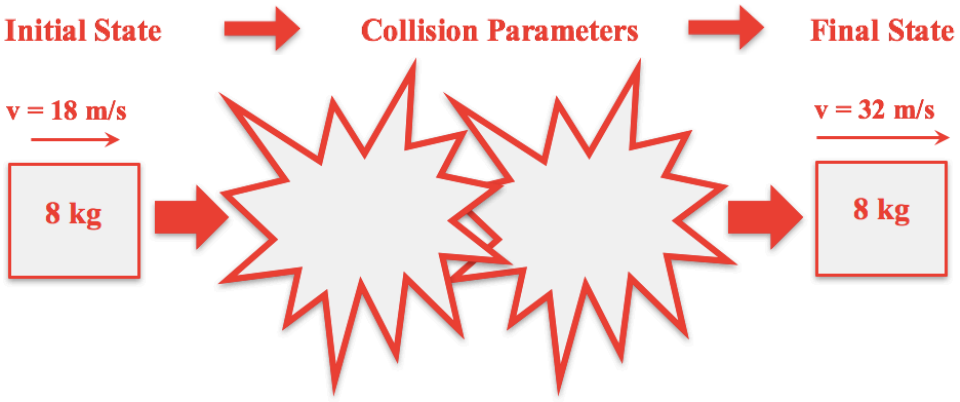
For the given pre- and post-collision information, identify the collision parameters that are consistent with the indicated momentum change. Pick two sets of parameters. (A + sign indicates a rightward direction; a - sign indicates a leftward direction.)



a. F = 16 N, Δt = 2 s
b. F = +96 N, Δt = 2 s
c. Δp = +112 kg•m/s
d. Δp = +48 kg•m/s
e. Impulse 26 N•s

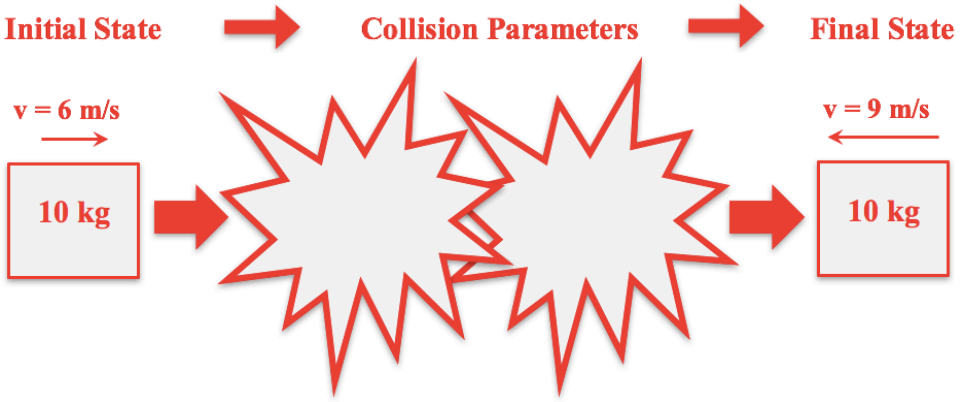
Question 51

For the given pre- and post-collision information, identify the collision parameters that are consistent with the indicated momentum change. Pick two sets of parameters. (A + sign indicates a rightward direction; a - sign indicates a leftward direction.)



a. $\Delta p = +16$ kg•m/s
b. $\Delta p = +224$ kg•m/s
c. $F = +88$ N, $\Delta t = 2$ s
d. $F = 48$ N, $\Delta t = 2$ s
e. Impulse 24 N•s

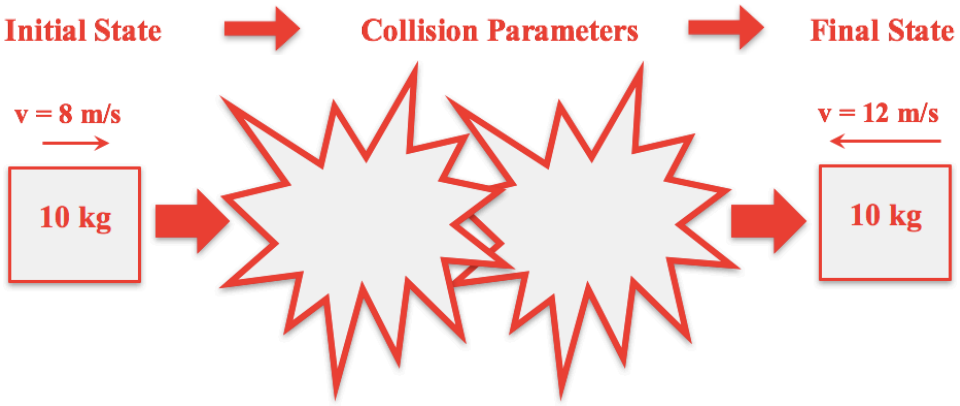
Question Group 18
Question 52
For the given pre- and post-collision information, identify the collision parameters that are consistent with the indicated momentum change. Pick two sets of parameters. (A + sign indicates a rightward direction; a - sign indicates a leftward direction.)



a. F = -90 N, Δt = 2 s
b. Δp = +30 kg•m/s
c. Impulse = -75 N•s
d. F = +60 N, Δt = 2 s
e. Impulse = -30 N•s

Question 53

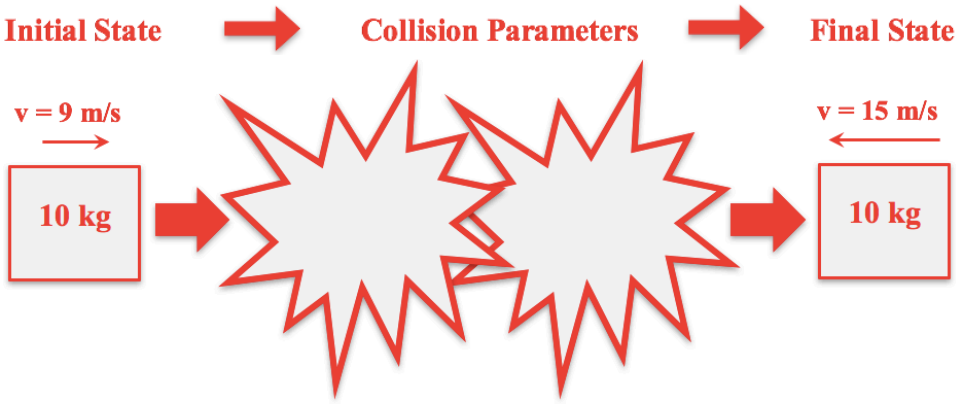
For the given pre- and post-collision information, identify the collision parameters that are consistent with the indicated momentum change. Pick two sets of parameters. (A + sign indicates a rightward direction; a - sign indicates a leftward direction.)



a. F = -120 N, Δt = 2 s
b. Impulse = -40 N•s
c. F = -80 N, Δt = 3 s
d. Δp = +40 kg•m/s
e. Impulse = +80 N•s

Question 54

For the given pre- and post-collision information, identify the collision parameters that are consistent with the indicated momentum change. Pick two sets of parameters. (A + sign indicates a rightward direction; a - sign indicates a leftward direction.)



a. Impulse = +30 N•s
b. F = -150 N, Δt = 2 s
c. Δp = -60 kg•m/s
d. F = -90 N, Δt = 2 s
e. Impulse = -90 N•s