Physics of Iron Man 3

Hollywood movies tend to bend the laws of physics for dramatic effect. We will analyze the movie "Iron Man 3" to explore situations where matter, energy and the laws of physics are changed to suit a storyline.

NOTE: Points will be deducted for incorrect or missing unit.

$$\bar{v} = \frac{d}{t}$$

$$a = \frac{\Delta v}{t}$$

$$v_f = v_i + at$$

$$d = v_i t + \frac{1}{2} a t^2$$

$$v_f^2 = v_i^2 + 2ad$$

1. In the elevator in the opening scene Tony Stark tells Aldrich Killian of A.I.M. to "meet him up on the roof". If the roof is 100 meters high and Mr. Killian dropped his iPhone from the roof (neglecting air resistance), how long would it take for the phone to reach the ground?

2. Tony's computer J.A.R.V.I.S. tells him that he's been awake for 72 hours. How many seconds are there in 72 hours?

3. When Tony uses microprocessor buried in his skin to put on his Iron Man suit the piece fly to his body. If each piece starts from rest and achieves a velocity of 6 m/s in 1.5 seconds then what is the acceleration of the pieces?

4. Multiple Mk-4 Folding-Fin Aerial Rockets are fired at Tony Stark's house. These rockets can achieve speeds of 457 m/s. If they are fired from a distance of ½ mile (804 meters) how long will it take each rocket to reach Tony's beautiful ocean-view, cliff-side mansion?

5. Tony's mansion falls into the ocean. If it takes 3.5 seconds for the mansion to reach the ocean then how far did it fall?

6. After he plummets to the bottom of the ocean, J.A.R.V.I.S. saves Tony by flying him to Tennessee. When he wakes up, Tony crashes into a snow covered field. If Tony free falls for 20 seconds, what will be his final velocity and how far will he fall? (**HINT**: 2 formulas are needed)

7. Tony's Audi R8 can accelerate from 0 to 62 miles per hour (27.7 m/s) in 4.8 seconds. How far will he travel during the 4.8 seconds? (**HINT**: 2 formulas are needed)

8. The Iron Man suit flies out of Harley's barn. While climbing into the sky it accelerates at 10.43 m/s^2 for 4 seconds. What is the suits final velocity?

9. Aldrich Killian sends Savin, in the Iron Patriot suit, to kill President Ellis as he boards Air Force 1. If Air Force 1 accelerates down the runway at 3.20 m/s^2 for 32.8 s until it finally lifts off the ground then what distance will it travel before it takes off?

10. On the impounded Roxxon tanker, responsible for an oil spill, Aldrich Killian plans on executing President Ellis for his lack of action taken against Roxxon for the disaster. Each of Tony's suits is seen knocking Aldrich's minions from upper areas of the tanker. If each Minion falls for 3.5s seconds then how far do they fall?

11. Tony and Aldrich run at each other during the movie's final scene. If Tony accelerates at Aldrich at 1.1 m/s^2 for 9.58s what will be Tony's final velocity?

12. Pepper kicks a micro-missile at Aldrich killing him. If the missile travels 25 feet (7.62 meters) in 1.25 seconds then what is its acceleration?