**Kinematics 1D: Problems 2**

NAME: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ DATE: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ PERIOD: \_\_\_\_\_\_\_\_\_\_\_

Kinematics

$v=v\_{o}+at$ $x-x\_{o}=v\_{o}t+\frac{1}{2}at^{2}$ $v^{2}=v\_{o}^{2}+2a(x-x\_{o})$

**I. Resolve the following problems. Use the G.U. F.S. procedure and show all the work on a separate sheet of paper to get credit. Use pencil, be clear and clean and don’t forget to include the final unit on your solutions.**

1. If Michael Jordan has a vertical leap of 1.29 m, then what is his takeoff speed and his hang time (total time to move upwards to the peak and then return to the ground)?
2. A bullet leaves a rifle with a muzzle velocity of 521 m/s. While accelerating through the barrel of the rifle, the bullet moves a distance of 0.840 m. Determine the acceleration of the bullet (assume a uniform acceleration).
3. A baseball is popped straight up into the air and has a hang-time of 6.25 s. Determine the height to which the ball rises before it reaches its peak. (Hint: the time to rise to the peak is one-half the total hang-time.)
4. The observation deck of tall skyscraper 370 m above the street. Determine the time required for a penny to free fall from the deck to the street below.
5. A bullet is moving at a speed of 367 m/s when it embeds into a lump of moist clay. The bullet penetrates for a distance of 0.0621 m. Determine the acceleration of the bullet while moving into the clay. (Assume a uniform acceleration.)
6. A stone is dropped into a deep well and is heard to hit the water 3.41 s after being dropped. Determine the depth of the well.
7. It was once recorded that a Jaguar left skid marks which were 290 m in length. Assuming that the Jaguar skidded to a stop with a constant acceleration of -3.90 m/s2, determine the speed of the Jaguar before it began to skid.
8. A plane has a takeoff speed of 88.3 m/s and requires 1365 m to reach that speed. Determine the acceleration of the plane and the time required to reach this speed.
9. A dragster accelerates to a speed of 112 m/s over a distance of 398 m. Determine the acceleration (assume uniform) of the dragster.
10. With what speed in miles/hr (1 m/s = 2.23 mi/hr) must an object be thrown to reach a height of 91.5 m (equivalent to one football field)? Assume negligible air resistance.
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