

MATH2214 - (Take Home) Quiz No2- Fall 03- Konaté

Notice: Show your work. A right answer with a bad reasoning will be considered as wrong. Class abstracts are allowed. No calculator allowed.

A•

A ball of $\frac{1}{4}kg$ is thrown upward from the ground with an initial velocity of $60m/s$. A drag force applies with a drag constant equal to $\frac{1}{20}$.

- 1• Find the height reached by the ball. (**20 points**)
- 2• Find the speed at which the ball falls down on the ground when we suppose that on its way down the drag force is negligible. (**20 points**)

B•

A tank with a total capacity of 200 liters is filled with 100 liters of pure water. A mixture at a concentration of $2g$ of salt per liter enters the tank at a rate of 40 liters per minute. A well-stirred mixture leaves the tank at the rate of 20 liters per minute. $Q(t)$ denotes the amount of salt in the tank at the time t .

- 1• Find the equation describing the evolution of $Q(t)$ (**20 points**)
 - 2• What is the concentration of salt in the tank at the time it is completely filled with water? (**40 points**)
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