

Høsten 2019

FYS100 Fysikk: Hand-in I

To be handed in at the latest **Friday 23. August 2019, at 23.59.**

You **must** hand it in by scanning your handwritten solution or compiling your electronic documents into **a single .pdf** file, and uploading it to Canvas in "Hand-in 1". Bad mobile phone pictures are not acceptable (there are apps that work OK), nor are any other file formats than a single .pdf.

You **must**:

- Put your name and student number on each page.
- Make sketches for all problems, where it makes sense.
- Write in a readable, well-structured way.

Pass is 40% correct (including partial credit). There is no grade. There is **no option** to correct and resubmit.

Good luck!

Problem 1: Significant figures (1.36 from the book)

How many significant figures are there in the following numbers?

- a) 78.9 ± 0.2
- b) 3.788×10^9
- c) 2.46×10^{-6}
- c) 0.0053

Problem 2: Conversion of Units

An aircraft on final approach to Stavanger Airport arrives over Hafsfjord roughly 5.1 kilometres from the end of the runway (directly west from the UiS campus).

- a) If the aircraft maintains a true groundspeed of 150 knots, how long in seconds does it take for the aircraft to reach the runway? (One knot equals one nautical mile per hour. One nautical mile equals 1852 metres.)
- b) If the aircraft has an altitude of 600 feet when it arrives over Hafsfjord, what angle does its flight-path make with the ground as it flies down to the runway? (One foot equals 0.3048 metres.)

Problem 3: Vectors

A particle in an 3-dimensional x-y-z coordinate system has a velocity vector with components $(5 \sin \theta, 5 \cos \theta, 12)$, where $\theta = 3t$.

- a) What are the components of the velocity vector at the time $t = 0s$?
- b) What is the magnitude of the velocity at the time $t = 0s$?
- c) What is the magnitude of the velocity at the time $t = 7s$? What is the change in the velocity magnitude?
- d) Find the components of the acceleration of the particle.
- e) What are the components of the acceleration vector at the time $t = 0s$?
- f) What is the magnitude of the acceleration?
- g) Describe in words the motion of the particle.