**1. Light-tissue interaction (20%)**

Download the data for the molar extinction coefficients of oxy- and deoxyhemoglobin as a function of wavelength from the Website (https://omlc.org/spectra/hemoglobin/), convert the molar extinction coefficients to absorption coefficients of oxy- and deoxyhemoglobin, and plot the two curves in MATLAB (or similar programming platform).

**2. Optical biosensor (20%)**

What is FRET? Explain how it works.

Ans:

FRET is a kind of dipole to dipole interaction between proteins that occurs at a very small distance, typically less than 10 nm. The application of this interaction is to reveal if proteins are interacting with each other. The basic idea is to attach(fuse) fluorophores to a proteins. Now, we excite the first protein-fluorophore pair