

## DEE-53106 Introduction to Renewable Energy Sources

Examination on 18.4.2016

1. Which of the following statements are true and which are not? Answer just true or false. One point is given from each right answer and one point is taken away from each wrong answer. No points are provided or taken from an empty answer.
  - a) Peat has the largest known resources of primary energy globally in the world.
  - b) It takes 3-6 months for a wind turbine to produce the energy that goes into production, operation and recycling of the turbine.
  - c) Uranium has the highest energy density (in TJ/kg) of all the energy sources used in operative power plants.
  - d) Share of the renewable energy sources is close to 30 % of the global electrical energy generation capacity.
  - e) Oil discoveries in new oil fields have been smaller than the consumption of oil for the last 30 years.
  
2.
  - a) How does the intensity of solar radiation on the surface of the Earth depend on the position of Sun in the sky?
  - b) What happens to the solar radiation when it passes true the atmosphere to the surface of the Earth?
  
3.
  - a) Deduce the equation of available power of wind having density  $\rho$  and velocity  $v$  for a wind mill with blades of length  $l$  starting from basic equations of physics.
  - b) What is the share of bioenergy compared to other sources of renewable energy in power production?  
30% 1,5%
  
4.
  - a) Name all the renewable energy sources used for producing electric energy.
  - b) Put the renewable energy sources in order of magnitude in terms of their existing global electric power production capacity.  
vesi  
432 GW  
178 GW