You can answer in English or in Finnish

1. Are the following statements true?
   You have three options to be selected (Y=yes / N=no / DK = don’t know). Right answer means
   one point (+1p) and the wrong answer one minus point (-1p). If you choose the option DK (=
   don’t know), you will get zero point (0p). Maximum is 6p and minimum 0p in all.
   a) Distributed generation along the medium voltage feeder raise the voltage level
      of the feeder.
   b) European Union’s 20-20-20 targets mean that for example 20 % of energy
      consumption in EU comes from renewable resources in 2020.
   c) Distribution System Operator (DSO) is responsible for buying electricity from
      wholesale market (i.e. electricity exchange)
   d) A microgrid can be determined as a segment of Smart Grid with intended island
      operation capability.
   e) Solar power was just in the third place in new installed power generation
      capacity in the EU27 in 2012
   f) One essential feature of Smart Grids is that the power flows are controllable and
      multi-directional.

2. Define shortly the following terms or concepts (1.5p/each)
   a) DMS (Distribution management system)
   b) Virtual Power Plant (VPP)
   c) Day-ahead (spot) market
   d) Time-of-use pricing

3. a) List the main benefits which can be achieved by “Demand Response” (3p)
   b) Compare briefly the roles of electricity retailer and DSO (3p)

4. Explain briefly
   a) why low voltage (LV) network have a significant role in future Smart Grids (3p)
   b) different roles that electric vehicles could have in Smart Grids (3p)