1) Explain typical feeder protection solution, which can be applied in radially operated and neutral isolated medium voltage network. Which protection functions are used, what are the principles in definition of relay settings?

2) Explain briefly what kind of communication is typically used in the following applications of distribution automation and why:
   a) Communication inside substation
   b) Communication between control center and substations
   c) Customer meter reading

3) Describe briefly, how the development of distribution automation has changed the following operational processes:
   a) Location of short circuit faults in medium voltage network
   b) Handling of low voltage network faults
   c) Customer service during fault situations

4) Calculate the reliability indices SAIFI, SAIDI and MAIFI in the following simple feeder. Calculate the indices also in case when the disconnector is remote controlled, which means that switching time is 5 minutes. What else method could be used to evaluate reliability?

Failure rate = 5 faults / 100 km, a

Temporary failure rate = 40 faults / 100 km, a

Switching time of disconnector 1 h, repair time 3 h

Area 1

Line length 20 km

Number of customers 400

Area 2

Line length 40 km

Number of customers 200