Verta

Oikosullu — Asettelut Øsk ↑ASH *Jälleenkytkentä* *Suojaus mehanismit*
↳ — Maasulkusuojaus
aika Maasullu | *maasta erotettu* | *— Oikosulkusuojaus*
sede | *— Vatkeileva maasullu*
Selti-
tsvisus Virta & jännite-ehto *— Jälleenkythennat*

DEE-24116 Distribution Automation   Examination, September 26, 2016

Pekka Verho (Calculator allowed)

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) 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

3) 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

4) Calculate the reliability indices <u>SAIFI</u>, <u>SAIDI</u> and <u>MAIFI</u> in the following simple feeder. Calculate the indices also in case when the disconnector is remote controlled (switching time is 5 minutes) and in the case when the disconnector is replaced by a circuit breaker. 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
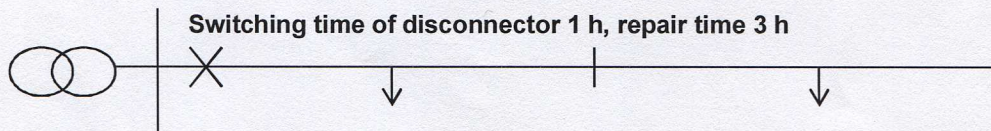
Area 1	**Area 2**
Line length 20 km	**Line length 40 km**
Number of customers 400	**Number of customers 200**

Maasulkusuojaus
|
Virta ja jännite — maa staerotettu
**
pienempia kuin Sammutetussa

8,33 %

maadoitus, lähtojen pituudet, terminen kesto