Tutorial 2

1) List the variables that can be used to model a renewable power plant in “power flow” (or load flow) analysis.

2) List the key assumptions in power flow analysis:

3) Why iterative numerical methods are being used in power flow program?

4) What are the general steps to carry out power flow analysis with the aid of power flow software.

5) How can DG affect distribution losses when the capacity is still limited.

6) Which one is more of a concern in a distribution network with significant DGs, overvoltage or undervoltage?

7) Use an example to explain why the biggest reduction in losses is obtained when the DG is located at the same premises as the consumption?

8) A radial distribution feeder is shown in Figure 1. Assume the impact of reactive power is negligible. The consumption data for the loads is provided in Table 1.

(a) Determine the “first hosting capacity” of all the feeders.

(b) Using the data provided in Table 2 to determine the “second hosting capacity” (when the actual overload starts to occur) for all feeder sections.

(c) Based on the results obtained in part (b), determine the threshold at which circuit breaker at location A will trip.

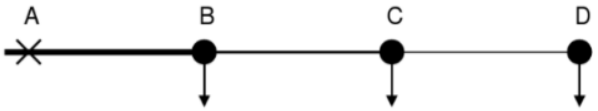

Fig. 1

Table 1- Consumption data

	B	C	D
Maximum Active Power	2.5 MW	3 MW	2MW
Minimum Active Power	600 kW	800 kW	500 kW

Table 2- Conductor data

Feeder Section	**AB**	**BC**	**CD**
Maximum permissible Power	10 MVA	6MVA	4 MVA

9) In determining the hosting capacity of a distribution network (the maximum amount of DG that can be connected), why losses are less of a concern than overloading?

10) List different techniques to improve the hosting capacity when overloading is the main concern by introducing DG.