

**KING FAHD UNIVERSITY OF PETROLEUM & MINERALS**

**Electrical Engineering Department**

**EE 465 Second Major Exam: December 27, 2005**

**Dr. Zakariya Al-Hamouz**

**Q1) [50 points]**

A 3-phase, 60 Hz, 240 km completely transposed line has the following ABCD parameters:

$$\vec{A} = 0.9497 \angle 0.57^\circ$$

$$\vec{B} = 148.54 \angle 79.44^\circ \Omega$$

$$\vec{C} = 0.00067 \angle 90.18^\circ S$$

The line is connected to a load of 50 MVA at a lagging power factor of 0.85 at 138 kV.

Calculate:

- Sending end voltage,
- Sending end current,
- Sending end power factor,
- Sending end charging current at no load
- % VR
- % efficiency.

**Q2) [50 points]**

A DC high voltage source (with a voltage of 1000-V as the first sending value and its internal impedance is 0) is connected to the sending end of an underground cable with characteristics impedance of  $40 \Omega$ . Assume the cable is terminated with a  $60 \Omega$  resistor.

Determine:

- Reflection coefficient at the sending end,
- Reflection coefficient at the receiving end,
- Draw the associated lattice diagram showing the value of each reflected voltage,
- Determine the value of voltage at  $t = 6. \tau$  and  $x = \frac{3}{4} l$ .
- Plot the receiving end voltage versus time.