KING FADD UNIVERSITY OF PETROLEUM & MINERALS
ELECTRICAL ENGINEERING DEPT.
EE 466 First Major Exam
October 29, 2007, Time: 5:30 – 6:45 pm
Instructor: Dr. Zakariya Al-Hamouz

Q1 [15 points]

Comment briefly on the following:

a) protection of a power system,
b) differential relay,
c) Infinite bus bar.

Q2 [25 points]

A three phase transmission line feeding a balanced Y- connected load has phase a open. The load neutral is grounded. Calculate the sequence currents and the neutral current if:

$$\mathbf{I}b = 12 \angle 0 \quad A$$
$$\mathbf{I}c = 12 \angle 120 \text{ A}$$

Q3 [60 points]

Consider the system shown in Fig. 1 and assume the following data are given on the same base:

Generator G_1: 50 MVA, 12 kV, $X_1 = X_2$ =0.2 pu, X_0 =0.1 pu,
Generator G_2: 100 MVA, 15 kV, X_1 =0.2 pu, X_2 =0.23 pu, X_0 =0.1 pu,
Transformer T_1: 50 MVA, 10 kV / 138 kV, $X_1 = X_2 = X_0 = 0.1$ pu.
Transformer T_2: 100 MVA, 15 kV / 138 kV, $X_1 = X_2 = X_0 = 0.1$ pu.
Each Transmission line is 138 kV $X_1 = X_2$ =40 ohms, X_0 =100 ohms.

For a single line to ground fault on phase a, calculate the fault current in amperes.

Use the 100 MVA and 15 kV as base values.