10 Members per Group

EEE4210 ASSIGNMNENT 1 [40 Marks] due 27/11/2025

(a) An overhead transmission line at a river crossing is supported from two towers at height of 30m and 70m above the water level. The horizontal distance between the towers is 250m. If the required clearance between the conductors and the water midway between the towers is 45m and if both the towers are on the same side of the point of maximum sag, draw parabolic configuration diagram and calculate the tension in the conductor. The weight of the conductor is 0.85 kg/m. **[10 Marks]**

(b) A radial power system network is shown in Fig (b), a three-phase balanced fault occurs at point ***F***. Determine the fault current and the line voltage at 11.8kV bus under fault condition. **[10 Marks]**

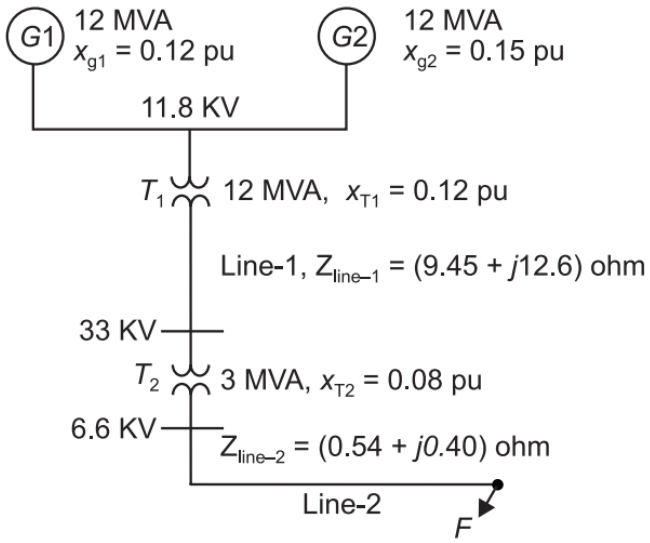

Fig. (b)

c) An ungrounded wye-connected generator having a sub-transient reactance X''_d = 0.12 p.u, a negative-sequence reactance X_2 = 0.15 p.u, and a zero–sequence reactance X_0 = 0.05 p.u is faulted at its terminals with a line-to-line short circuit. The generator is rated 10,000kVA, 13.8kV, and operates at 50Hz. Determine:

(i) the line-to-line sub-transient short-circuit current

(ii) the line-to-line voltages at fault point in kV and,

(iii) the ratio of that current with respect to three-phase short circuit current.

[20 Marks]