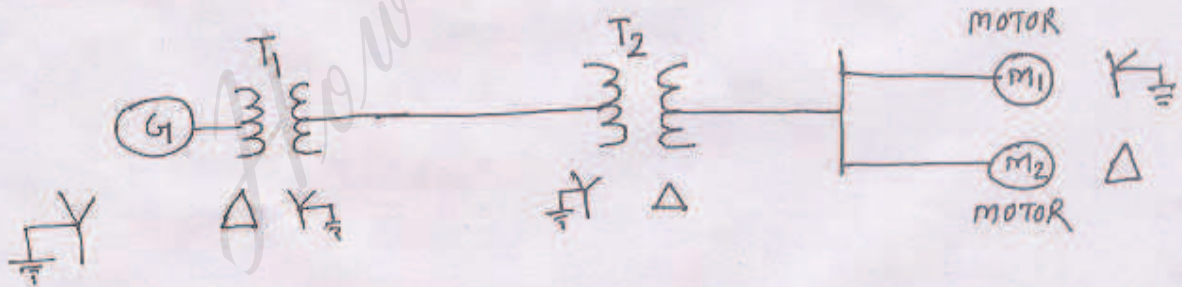


- N.B. : (1) Question No. 1 is compulsory.
 (2) Attempt any four questions from remaining six questions.
 (3) Assume suitable data if necessary.

TELECOM & POWER ELEMENTS of Power Systems

MASTER
17/12/07
20

1. Explain :-
 - (a) Tuned Power Lines.
 - (b) Step Potential and Touch Potential.
 - (c) Method of Neutral Grounding.
 - (d) Arcing Grounds.
2. (a) Derive the capacitance of a three-phase line with unsymmetrical spacing. What is the effect of earth on capacitance ? 12
 (b) Find the capacitance per phase per km, capacitive reactance per phase, charging current and total charging mega volt-ampere of the following line : 8
 $V = 220 \text{ kV}$, 50 Hz , $\text{Length} = 250 \text{ km}$, $\text{Spacing} = 6.5 \text{ m} \times 6.5 \text{ m} \times 12 \text{ m}$,
 $\text{Conductor Radius} = 1.96 \text{ cm}$.
3. (a) Explain Ferranti effect. 8
 (b) Explain in brief the current rating of a cable. 12
4. (a) Describe the methods to improve string-efficiency. 10
 (b) Describe the different method of voltage-control. 10
5. (a) Find the A, B, C, D constants of medium length transmission line, represented by nominal π model. Draw the phasor diagram. 10
 (b) Explain in detail the measurement of earth resistance and soil resistivity. 10
6. (a) Single line diagram of a system is shown in figure. Draw the reactance diagrams and indicate the reactance in per unit : 15



- Generator : 90 MVA, 11kV, $X = 25\%$
 Transformer T_1 : 100 MVA, 10/132 kV, $X = 6\%$
 Transformer T_2 : Composed of three 1- ϕ units each rated at 30 MVA, 66/10 kV, $X = 5\%$
 Motor M_1 : 50 MVA, 10 kV, $X = 20\%$
 Motor M_2 : 40 MVA, 10 kV, $X = 20\%$
 Line reactance = 100 OHM

Consider generator rating as base value.

- (b) Define and explain 'Self and Mutual GMD'. 5
7. (a) Explain skin effect. 20
 (b) Explain significance of transposition.
 (c) Advantage of per unit system.
 (d) Explain bundled conductor.