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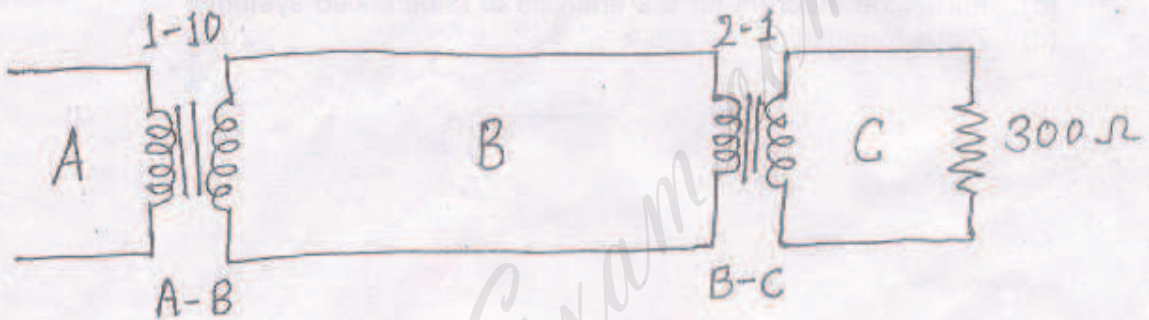
- N.B. :** (1) Question No. 1 is compulsory.
 (2) Solve any four questions from remaining six questions.
 (3) Assume suitable data if necessary.

T. E. Elect Sem VI Rev Power Transmission

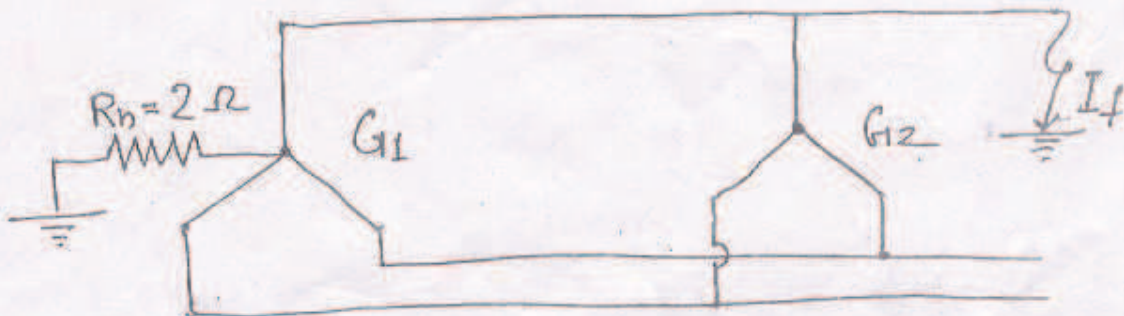
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1. (a) What are the different types of HVDC links ? Explain it with the help of neat diagrams. 10
 (b) Write short notes on :
 (i) Fault calculations using Z bus. 5
 (ii) Significance of surge impedance loading. 5
2. (a) Three parts of a single-phase electric system are designated A, B and C and are connected to each other through transformers, as shown in figure below. The transformers are rated as follows :
 A-B 10,000 kVA, 13.8/138 kV, leakage reactance 10% B-C 10,000 kVA, 138/69 kV, leakage reactance 8%. If the base in circuit B is chosen as 10,000 kVA, 138 kV, find the per-unit impedance of the 300 Ω resistive load in circuit C referred to circuits C, B and A. Draw the impedance diagram neglecting magnetizing current, transformer resistances, and line impedances. 10



- (b) Write short notes on : 10
 (i) Arrestor rating
 (ii) Insulation co-ordination.
3. (a) One conductor of a three-phase line is open. The current flowing to the Δ-connected load through line 'a' is 10 A. With the current in line 'a' as reference and assuming that line 'c' is open, find the symmetrical component of the line currents. The current flowing through line 'b' is 10 ∠180° A. 10
 (b) Explain the following :
 (i) Factors affecting the selection of circuit breakers. 5
 (ii) Causes of overvoltages in power system. 5
4. (a) Two 11 kV, 20 MVA, three-phase, star connected generators operate in parallel as shown in figure. The positive, negative and zero sequence reactances of each being, respectively, j0.18, j0.15, j0.10 pu. A single line to ground fault occurs at the terminals of one of the generators. Estimate : (i) the fault current (ii) current in grounding resistor and (iii) the voltage across grounding resistor. 12



- (b) Draw and explain typical waveform of voltage and current over a transmission line terminating through an open circuit. 8

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T.E. (Elect) (Sem-III) (Rev.)
Power Transmission

5. (a) With respect to Corona discuss the following : 8
- (i) Factors affecting corona
 - (ii) Critical disruptive voltage.
 - (iii) Visual critical disruptive voltage
 - (iv) Corona loss.
- (b) A 50 Hz generator is rated 500 MVA, 22 kV. It is Y-connected and solidly grounded and is operating at rated voltage at no load. It is disconnected from the rest of the system. Its reactances are $X''_d = X_1 = X_2 = 0.15$ and $X_0 = 0.05$ per unit. Find the ratio of the subtransient line current for a single line-to-ground fault to the subtransient line current for a symmetrical three phase fault. 12
6. (a) Derive the interconnection of sequence networks for L-L-G fault. 8
- (b) Compare EHV-AC and HVDC for the various aspects. 7
- (c) Write short note on 'Bewley lattice diagram'. 5
7. Write short notes on any three : 20
- (a) Arcing ground
 - (b) Working of lightning arrester
 - (c) Fortescue theorem for the analysis of unbalanced systems.
 - (d) Z-bus formulation.

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