Duration:- Three Hours   **Total Marks Assigned:- 80**
NOTE
1. Question No 1 is Compulsory.
2. Solve any three out of the remaining.
3. Figure to the right side indicates marks.
4. Assume the suitable data and mention the same if required

Q No 1 Answer the following

a. Why are the pre fault currents usually neglected in fault computation?   [5]

b. Why the HV lines are provided with ground wire as a topmost conductor?   [5]

c. Which type of fault/faults occurs frequently? And Why?   [5]

d. Why insulation coordination is required?   [5]

Q No 2a Derive the Fortesque Theorem for symmetrical component analysis   [10]

Q No 2b A 25 MVA 13.2 KV alternator with solidly grounded neutral has sub transient reactance of 0.25pu. The negative and zero sequence reluctances are 0.35 and 0.1 pu respectively. A single line to ground fault occurs at the terminals of an unloaded alternator; determine the fault current and line to line voltages. Neglect resistance   [10]

Q No 3a Derive the equation for Fault current for a double line to ground fault. State the various assumptions. Draw the sequence network for same.   [10]

Q No 3b In a Four bus system (1,2,3,4) Buses are connected to each other by 1Ω element as 1-2;2-4;4-3; 3-3 and 1-4. Taking Bus 4 as reference Obtain [Z_{Bus}]   [10]

Q No 4a Discuss the phenomenon of transient generation due to capacitance switching.   [10]

Q No 4b Discuss the terms with respect to lightning phenomenon **"Insulator Flashover, Withstand Voltage; Direct Stroke".**   [10]

Q No 5a A surge of 15 KV is traveling along the cable towards the junction with an overhead line. the inductance and capacitance of cable and overhead line are respectively 0.3 mH, 0.4uF and 1.5mH ,0.012 uF per km. Find the voltage rise at the junction due to surge.   [10]

Q No 5b Write an algorithm for short circuit studies.   [10]

Q No 6a Find critical disruptive voltage, and critical voltage for local and general corona on three phase over head transmission line consisting of three stranded copper conductors spaced 2.5 m apart at the corners of an equilateral triangle. Air temperature and pressure are 21degree centigrade and 73.6 cm of mercury respectively. The conductor diameter, surface irregularity factor and surface factors are 10.4mm,0.85, 0.7 and 0.8 respectively.   [10]

Q No 6b Discuss the sequence networks of Synchronous Machine   [10]

_____

55729