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Department: Electrical/ Electronics Engineering
Course Title: Electric Machines II
Course code: EEE 326
Assignment: 2
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Questions;

1. Discuss the effects of Harmonics on synchronous machines (hint" identify the harmonics, state how they affect synchronous motors, state how they affect synchronous generators)
2. Justify technically why the stator windings of large generators are star connected.
3. Why is that the armature for large machines is stationary?
4. Why do brush-less generators undergo less maintenance.
5.

Answers

2. In Large generators they include a neutral point which is to be grounded through a resistor for stability.This neutral point allows a path for circulating currents under in balanced loaded conditions and during faults. If there was no path for hen flow of fault current and a line to ground fault occurs in one of the three phases, there would be a rise in voltages in the other two healthy phases and eventually, it would cause insulation failure in the other two phases and the line to ground fault would lead to a 3 phase fault. A neutral point would avoid all this and limit the fault condition to one phase only. Insulation would be protected, and the lines can operational after fault isolation.And therefore a star connection is necessary for this to happen.

3. The armature is stationary because of the following reasons;
   a) If there's armature on the rotor, rotor have high inertia requires a high initial torque as well as running torque.
   b) In order to collect high power 3 to 4 brushes(3 phase 3 wire system or 3 phase 4 wire system,etc) on shaft is needed. It may lead to sparking as well as frictional losses.
   c) The Armature is more bulky for High power generation.

4. The brush-lees Generators have reduced maintenance due to elimination of brushes(i.e for the fact that people don't have to replace or fix any brushes at all causes individuals to schedule for maintenance).