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Question 1

Skin Effect

In case of AC Current, Current flows in Periphery or Skin of Transmission Lines due to Self-Inductance in Conductors. At higher Frequency Skin Effect increases. Due to Skin Effect, Effective Resistance increases. This increases Loss and increase in Temperature.

Increase in Iron Loss in Transformers connected to Generator

Iron Loss consists of Hysteresis Loss and Eddy Current Loss. Hysteresis Loss $\propto f$ and Eddy Current Loss $\propto f^2$. Thus Iron Loss increases resulting in Higher Loss in Core of Transformer and Temperature is increased.

Retarding Torque in Induction Motor

5_{th} Harmonic produces flux rotating in opposite direction to Main Flux in Induction Motor. This Flux produces Retarding Torque in Induction Motor.

Crawling in Induction Motor

7_{th} Harmonic creates dip in Torque Speed Curve of Induction Motor at $1/7_{th}$ the Synchronous Speed. This may result in Induction Motor running at $1/7_{th}$ the Synchronous Speed. This is called Crawling.

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- The phase voltage is 0.577 times the line voltage which results in lesser voltage stress and hence lesser insulation cost.
- The availability of the neutral point which can be grounded and thus provide a path for circulating current in case there is any unbalance in the load end or some fault occurs.
- In star connection there is a neutral availability if there is any problem. And another one is it reduces the high voltage values.
- The armature winding of alternator have a six output terminal, in which three terminal short (make neutral point) and remaining three gives output which are possible only in star connection. So we are connected in star

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The armature is placed in the stationary position reasons go as follows

- Higher peripheral speed can be achieved in the rotor.
- It is easier to insulate stationary winding for high voltages for which the alternators are usually designed. It is because they are not subjected to centrifugal forces and also extra space is available due to the stationary arrangement of the armature.
- The stationary 3-phase armature can be directly connected to load without going through large, unreliable slip rings and brushes.
- Only two slip rings are required for d.c. supply to the field winding on the rotor. Since the exciting current is small, the slip rings and brush gear required are of light construction.
- Due to the simple and robust construction of the rotor, the higher speed of rotating DC field is possible. This increases the output obtainable from a machine of given dimensions

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The brushless technology does not have a contact zone, which considerably reduces wearing and maintenance.