Name: NDIBE ARIZE C.

MATRIC NO: 17/ENG06/056

COURSE: EEE326

DEPARTMENT: MECHANICAL ENGINEERING

1.

a. 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.

b. Increase in Iron Loss in Transformers connected to Generator: Iron Loss consists of Hysteresis Loss and Eddy Current Loss. Hysteresis Loss ∝ f and Eddy Current Loss ∝ f². Thus Iron Loss increases resulting in Higher Loss in Core of Transformer and Temperature is increased.

c. Retarding Torque in Induction Motor: 5th Harmonic produces flux rotating in opposite direction to Main Flux in Induction Motor. This Flux produces Retarding Torque in Induction Motor.

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

2. The maximum value of flux density in the air gap is limited by magnetic saturation in the stator and rotor iron, and is typically about one tesla (weber per square metre). The effective, or root-mean-square (rms), voltage induced in one turn of a stator coil in a 2-pole, 60-hertz generator is about 170 volts for each metre squared of area encompassed by the turn. Large synchronous generators are usually designed for a terminal voltage of several thousand volts. Each stator coil may therefore contain a number of insulated turns of conductor, and each stator winding usually consists of a number of similar coils placed in sequential slots in the stator surface and connected in series as shown for the winding a-a′. The armature winding of the alternator is generally connected in star because of two main reasons: 1.The phase voltage is 0.577 times the line voltage which results in lesser voltage stress and hence lesser insulation cost. 2. 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.

3. It is quite simple to understand why is armature winding in a large machine is stationary.

As when you work with an electrical machine such as motor whether it is DC or AC, synchronies or induction you will always want 100℅ output and this output depends on some advantageous conditions or factors. So, in the same sense “the armature winding is stationary because of some advantages” listed below:-

1. It is easier to collect current through brushes from stationary armature in case of generators.

2. When armature winding is stationary and field winding rotates we get more output as field winding is quite lighter than armature winding.

3. There is less chances of sparking in stationary arm. Winding comparatively to stationary rotor.

4. Commutation is a problem in rotatory armature.

5 .As armature winding is stationary the natural cooling is more effective.

6. As rotating winding is field winding which is comparatively light so chances of wear and tear is less. I hope this will help you in understand why armature winding is stationary.

4.

In a brushless generator, the alternators are better suited for more long-term, constant usage because there are no brushes to replace or fix, and have fewer internal parts that can be damaged. You may be asking yourself, “How do they move the electrical current then?” A brushless alternator has two sets of rotors that spin together to generate and transfer the electrical current. It has a second, smaller generator on the end of the equipment instead of brushes, which it uses to transfer any electrical current. This is an immediate advantage over a brushed alternator because there are no brushes to replace or repair, saving you long term money and time. A disadvantage of a brushless alternator, however, is the much higher initial cost, as opposed to a brushed alternator. This is mostly because of the higher amount of materials used in a brushless alternator. Brushless alternators, however, are also more suited to be your primary alternator/generator and are more capable of long-term use. In the long run, you will save money by buying a brushless alternator, but keep in mind that it’s an investment because of the higher cost when compared to a brushed alternator.