Power quality essay samples

Power quality- Defined as set of electrical boundaries that allow a component to operate in its specified manner without loss of life expectancy and performance. The conclusion of god or bad power depends on the end user/ equipment. Power quality problems are caused by power frequency disturbances, electromagnetic interference and electrostatic discharge.

Loads.

- Frequency disturbances- Voltage sags or total power loss as the result of lightning/ contact with trees. Motors get asymmetrical- Caused by starting on large loads, therefore, current starts at a high level and flattens off over two to eight seconds. For example in starting a 50-hp induction motor at full load current of 60 A. In the first asymmetrical cycle, the current ay go to the peak current value of 860A. If the circuit feeding the motor has a high impendence them, voltage sag may result. To rectify such phenomena, these use voltage stabilizers.

- Electromagnetic interference - damage to transformers, cables and motors- Caused by the over current device is supplied by an overload power lines connected to long lengths of underground cables. Because underground cables have high capacitance to the ground. Caused by a combination of underground cable capacitance and inductance due to overhead lines. Isolation transformers provide minimal protection to equipments in case of lightning strikes. The high frequency lightning will couple from primary to secondary windings causing risk to connected equipments.

- Electrostatic discharge- Fluorescent lighting – The waveforms are composed of third and fifth harmonic frequencies. The current frequency has a flat top due to arc initiation in the gas tube. This makes the voltage across the tube

and current to become unchanged for some part of a half cycle. Such harmonics interact with the power system and affect the components.