

6. How lightning discharge occur?

Lightning occurs as a result of electric discharge in the atmosphere from charge-bearing cloud. Clouds capture charges from the atmosphere. As the result of the charge accumulation, clouds acquire sufficient high potential with respect to the ground. When the field intensity in a charged cloud exceeds the breakdown level, the result is electric discharge.

7. What are the two forms electric discharge that takes place from lightning discharge?

This electric discharge takes place from

- o a cloud to the ground
- o one cloud to another.

8. Define electromagnetic pulse .

A nuclear explosion results in the generation of an electromagnetic pulse. Nuclear electromagnetic pulse (NEMP) leads to the generation of electromagnetic interference (EMI).

9. What are the two broad phenomena of EMI generation associated with nuclear explosion?

Two broad phenomena of EMI generation are associated with nuclear explosion

- o When equipment or system is located very close to a nuclear burst, the weapon's X-rays or -rays interact with different materials of the system and lead to uncontrolled emission.
- o If nuclear explosions takes place in a region where density of air varies with height, an intense pulse of -rays is produced. These -rays travel in all directions. These collide with air molecules and produces fast-moving electrons (recoil electrons) and hence high current. In this case, propagation or radiation of electromagnetic waves can take place.

10. What are the two types of EMI from apparatus and circuits?

Various electrical, electromechanical, and electronic apparatus emit electromagnetic energy in the course of their normal operation. Such emissions may be broadly divided into two categories

1. Intentionally emitted signals
2. Unintentional emission during the operation of an equipment

11. What is meant by intentional radiation?

Intentional EMI sources are those originating from devices whose primary function depends on radiation operation. These sources include Radar, satellite, and communication transmitters.

12. What is meant by unintentional radiation?

Unintentional EMI sources are emitted from devices that transmit radio frequencies, although their primary function is not to radiate energy. Switching power supplies, transmission power cables and electric motors can be considered as sources of unintentional EMI.

13. List the EMI coupling methods

- (i) Inductive coupling
- (ii) Capacitive coupling
- (iii) Radiative coupling
- (iv) Conductive coupling

14. What is meant by ground coupled interference?

Electromagnetic interference resulting from an electromagnetic disturbance coupled from one circuit to another through a common earth or ground-return path.

15. What is crosstalk with reference to EMI/EMC design issues?

Coupling of electromagnetic energy from one cable to another in multi-conductor transmission lines results from magnetic field coupling when two cables are located close to each other.

This electromagnetic energy transfer or coupling from one transmission line to another is called **crosstalk**. This is a most common source of electromagnetic interference generation in electrical and electronics circuits.

Unit II Coupling Mechanism

1. Write notes on PCB level shielding, various factors

* Three levels of shielding on PCB shielding.

* Lightweight shields

* Mold-in-place combination Gasket

* Types of PCB shielding

(i) Multiple tin shield

(ii) clip-on-lid "

(iii) Metal "

* Board level shielding.

2. How can a gasket be used to suppress the EM leakage at joints.

* EMI Gaskets definition

* Knitted wire-mesh Gasket

* Wire-screen "

* Oriented wire-mesh "

* Conductive elastomer

* conductive Adhesive.

3. Define grounding and describe the principles of measurement of ground electrode resistance.

* Definition of grounding

* Principle of earth resistance measurement

