



SNS COLLEGE OF TECHNOLOGY
COIMBATORE-35
DEPARTMENT OF EEE



19EET202 & Analog Electronics

2 and 3 unit

2 marks with answers

1. Why MOSFET is called IGFET? Justify.

MOSFET stands for Metal Oxide Silicon Field Effect Transistor or Metal Oxide Semiconductor Field Effect Transistor. This is also called as IGFET meaning Insulated Gate Field Effect Transistor. The construction of a MOSFET is a bit similar to the FET. An oxide layer is deposited on the substrate to which the gate terminal is connected. This oxide layer acts as an insulator (SiO₂ insulates from the substrate), and hence the MOSFET has another name as IGFET.

2. Why E-MOSFET is called as OFF-MOSFET? Justify.

Enhancement type MOSFETS are normally off which means when an enhancement-type MOSFET is connected, there will be no flow of current from the terminal drain (D) to the source (S) when no voltage is given to its gate terminal. This is the reason to call this transistor a normally off device

3. List the applications of SCR.

1. It can be used as a speed controller in DC and AC motors.
2. It can be used as an inverter.
3. It can be used as timing circuits.
4. It is used in battery chargers.
5. It is used for phase control and heater control.
6. It is used in light dimming control circuits

4. **Infer the term intrinsic standoff ratio in UJT?**

In UJT the connections at the ends of the bar are known as bases B1 and B2; the P-type mid-point is the emitter. With the emitter disconnected, the total resistance R_{BB0} , a datasheet item, is the sum of R_{B1} and R_{B2} as. R_{BB0} ranges from 4-12k Ω for different device types. The

intrinsic standoff ratio η is the ratio of RB1 to RBBO. It varies from 0.4 to 0.8 for different devices.

5. List the advantages of Integrated Circuit.

The advantages of ICs :

- (i) Extremely small in size,
- (ii) Low power consumption,
- (iii) Reliability,
- (iv) Reduced cost,
- (v) Very small weight and
- (vi) Easy replacement.

6. Compare thin film and thick film technology in IC fabrication.

The advantages of **thick-film circuits** are reliable performance, flexible design, small investment, and low cost, and are mostly used in high-voltage, high-current, and high-power occasions;

Thin-film circuits are mostly used in high-precision, high-integration product fields, and are resistant to high temperatures, corrosion resistance, high insulation; ceramic substrates are usually used as base materials to process thin film ceramic circuit boards, which are popular.

7. Draw the structure of integrated circuit planar transistor.

8. Define the term epitaxial growth

Epitaxy or epitaxial growth is the process of depositing a thin layer (0.5 to 20 microns) of single crystal material over a single crystal substrate usually through chemical vapor deposition (CVD).

- In the same material as the substrate and the process is known as homoepitaxy, or simply, epi

9. Classify the IC's based on the device density.

Based on the method or techniques used in manufacturing them, types of ICs can be divided into three classes:

- Thin and thick film ICs
- Monolithic ICs
- Hybrid or multichip ICs

On the basis of the active devices used, the ICs are classified as

- Bipolar ICs
- Unipolar ICs

Depending upon the isolation technique used ,the bipolar ICs are further classified as

- Pn junctions isolation ICs
- Dielectric isolation ICs

Depending upon the type Of FET used,the unipolar ICs are further classified as

- MOSFET unipolar ICs
- JFET unipolar ICs

10. Define the term metallization.

Metalization may refer to one of a number of different processes: Coating a covering applied on an object's surface that improves surface properties: adhesion, resistance to corrosion or wear or scratches. Metallizing (also metalize) to coat, treat, or combine with a metal.

11. list the Advantages of epitaxial process

- i) Because of one or more buried layers, the designer can control the doping in the structure
- ii) The properties of the epitaxial layer and the bulk material are different
- iii) Using epitaxial structures the performances of RAMs (random access memories)and CMOS ICs can be improved

12. Write the Importance of sio2 layer

In the planar process it is essential to protect certain regions of surface of the wafer so that the dopant atoms may be driven into other selective regions during the process such as diffusion or ion implantation for such shielding purpose, silicon di oxide (SiO₂) is best suited.

13. List the types of IC packages

- DIP - dual in line package
- PGA – pin grid array

Based on TH mounting types

- SIP- single in line package
- ZIP – zigzagged in line package
- QIPC – quad in line package

Based on SM mounting types

- SO- small outline package
- SSOP- shrunk small outline package
- Chip carrier
- TQFP- thin quad flat pack

14. Define integrated circuit.

A packaged electronic circuit in which millions of discrete components are fabricated on a single silicon chip of the order of one square centimeter to perform the complete function is called an integrated circuit(IC)

15. What is the purpose of masking?

In general, a wafer consists of hundreds of identical circuits and each circuit may consist millions of devices. Thus identical steps are carried out simultaneously which required selected regions are exposed only; while the others are protected. This requirement can be fulfilled by using mask(protective layer pattern)