Hasnain Muavia
ID # 15831
B-Tech (Electrical)

Department of Electrical Engineering

Assignment

Date: 14/04/2020

Course Details

Course Title: Electronics **Module:** 2nd
Instructor: Sir sajid nawaz **Total Marks:** 30

Student Details

Name: Hasnain Muavia **Student ID:** 15831

Q1	Electronics components are widely used in the field of communication. Specify those equipment in which electronics components are used and describe the role of electronics in modern world technology.	**(10 marks)**
Q2	Explain working principal of P-N junction diode in forward and reverse biased condition.	**(10 marks)**
Q3	Differentiate between the following ➢ Intrinsic Semiconductor. ➢ Doped Semiconductor. ➢ Carriers movement.	**(10 marks)**

Hasnain Muavia
ID # 15831
B-Tech (Electrical)

Q1- Electronics components are widely used in the field of communication. Specify those equipment in which electronics components are used and describe the role of electronics in modern world technology.

Ans

Most of electronic devices or components are must be used in field of communication.

i.e. capacitor, resistor, inductor, diodes, chips, and ices etc.

Role of Electronics in Modern world

Electronics plays important role in this world. At this time electronics is using everywhere without electronics nothing is possible because electronics are used in our computers, mobiles, laptops, tablet, and many other accessories like communication system like communication towers etc. it is used in physics, used in computer engineering's, used in electrical engineering, like our DMM and many other equipment's that is why electronics are play important role in this world.

Hasnain Muavia
ID # 15831
B-Tech (Electrical)

Q2- Explain working principal of P-N junction diode in forward and reverse biased condition.

ANS

Diode

Diode is an electric component which is used to flow current in one direction in electrical circuit is called diode

Diode has two terminals

Flow current in one direction

Diode has anode and cathode

Positive current normally flows from anode to cathode

Diode protect circuits from harmful current and voltage

P-N junction

It is mainly two parts of diode like p-Junction and N-junction. A depletion layer will be found between these two junctions

Hasnain Muavia
ID # 15831
B-Tech (Electrical)

The PN junction under Forward - Bias conditions

>: The PN junction excited by a constant current source supplying a current in the forward direction

>; The depletion layer narrows and the barrier voltage decrease by V volts, which appears as an external voltage in the forward direction

- Turn-on voltage;
  - ✓ A conduction diode has approximately a constant voltage drop across it,
  - ✓ It's called turn-on voltage.

$V_{D(on)} = 0.7V$

$V_{D(on)} = 0.25V$

- Diodes with different current rating will exhibit the turn-on voltage at different currents.

The PN Junction under Reverse-Bias Conditions

- The PN junction excited by a constant-

Current source I in the reverse direction.

- To avoid breakdown, I is kept smaller Than I_S.
- Note that the depletion layer widens and

The barrier voltage increases by V_R volts,

Which appears between the terminals as a

Reverse voltage

Q3. Differentiate between the following

- Intrinsic Semiconductor.
- Doped Semiconductor.
- Carriers' movement.

ANS

Intrinsic Semiconductor

- A crystal of pure and regular lattice structure is called intrinsic semiconductor.
- Materials;
  - ✓ Silicon; today's IC technology is based entirely on silicon.
  - ✓ Germanium; early used.
  - ✓ Gallium arsenide; used for microwave circuits.
- Two-dimensional representation of the silicon crystal.
- **Carriers;**
  - A free electron is negative charge and a hole is positive charge.
  - Both of them can move in the crystal structure.
  - They can conduct electric current.

Doped Semiconductor

- Doped semiconductors are materials in which carriers of one kind predominate.
- Only two types of doped semiconductors are available.
- Conductivity of doped semiconductor is much greater than the one of intrinsic semiconductor.
- The *pn* junction is formed by doped semiconductor.
- A silicon crystal doped by a pentavalent element.
- Each dopant atom donates a free electron and is thus called a donor.
- The doped semiconductor becomes *n* type

Carriers Movement

- There are two mechanisms by which holes and free electrons move through a silicon crystal;
  - ✓ **Drift;**
    - The carrier motion is generated by the electrical field across a piece of silicon.
    - This motion will produce drift current.
  - ✓ **Diffusion;**
    - The carrier motion is generated by the different concentration of carrier in a piece of silicon.
    - The diffused motion usually carriers diffuse from high concentration to low concentration will give rise to diffusion current.