

# PNS school Engineering & Technology

Nishamani Vihar, Mershaghai, Kendrapara



Department of Electronics & Telecommunication Engineering

1<sup>st</sup> Internal Assessment Exam Questions & answer

SUB- Basic Electronics (Th-4b)

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# PNS School of Engineering & Technology

Nishamani Vihar, Mershaghai, Kendrapara

Internal Assessment Examination-2022(1<sup>st</sup> Semester)

Subject: Th-4(b)-Basic Electronics (Question & Answer)

Branch: Electrical Engineering

Prepared by- Er Aditya Narayan Jena, Lecture in Electronics & Telecommunication Dept.

No.1. Answer all the following questions.

**(a) Define Electronics. State its 2 applications.**

Ans. Electronics: It is the branch of engineering which deals with the study of flow of electrons through vacuum or gas or semiconductor.

Applications:

- Communication
- Medical Field.

**(b) Define Free Electron & Valence Electron.**

Ans Free Electron: The valence electron which are very loosely attached to the nucleus are called free electron.

Valence Electron: The number of electrons present in the outermost shell of an atom are called valence electron.

**(c) Write down the functions of rectifier & amplifier.**

Ans Rectifier: It converts ac into dc.

Amplifier: It increases the strength of a weak signal having less amplitude.

**No.2a] Classify the materials according to the electrical conductivity W.r.t. energy band diagram.**

Ans Classification of Materials:

According to electrical conductivity materials are of 3 types.

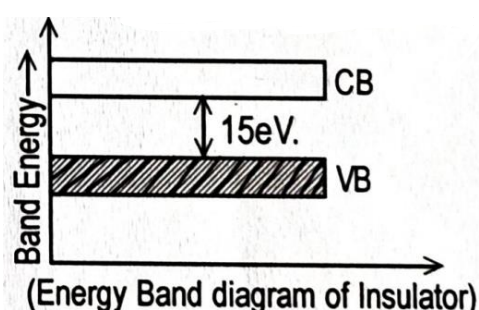
- (i) Insulators
- (ii) Semiconductor
- (iii) Conductor

(i) Insulators

❖ Insulators are those substances, who do not allow electric current and heat easily.  
For Eg; Glass, Mirror etc.

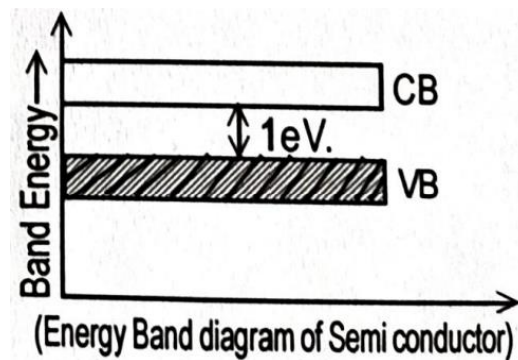
❖ In terms of Energy Band,

- Valence band is totally full.
- Conduction band is totally empty.
- Forbidden energy gap  $\cong 15$  eV.



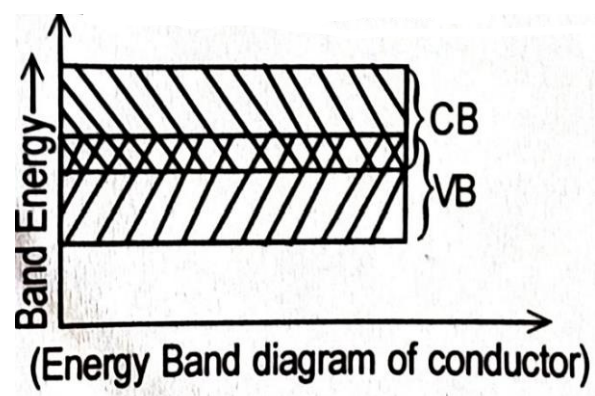
(ii) Semiconductor:

- ❖ Semiconductor are those substance whose electrical conductivity lies in between insulator and Conductor.  
For eg; Si, Ge etc.
- ❖ In terms of Energy Band,
  - Valence band is almost filled.
  - Conduction band is almost empty.
  - Forbidden energy gap  $\cong 1\text{eV}$ .



(iii) Conductor:

- ❖ Conductor are those substances who easily allow electric current and heat.  
For eg: Copper, Aluminum etc.
- ❖ In terms of Energy Band,
  - Valence band and conduction band are overlapping each other.
  - Forbidden Energy gap = 0 eV.



**2-(b) Define Electron emission. Discuss different types of Electron emission?**

Electron Emission:

- ❖ The process of Liberation of electrons from the surface of a substance, is Known as Electron Emission.
- ❖ The amount of additional energy required to remove an electron from a Metallic surface is known as Work function of that metal.

Types of Electron Emission:

- Generally, 4 types of Electron Emission are used they are;

- (1) Thermionic Emission
- (2) Field Emission
- (3) Photoelectric Emission
- (4) Secondary Emission

(1) Thermionic Emission:

- The process of electron emission from a metal surface by supplying of thermal energy to it, is known as Thermionic Emission.
- In this method, the metal is heated to sufficient temperature, to enable the free electron to leave the metal surface.
- The higher the temperature, the greater is the emission of electron.

(2) Field Emission:

- The process of Electron Emission by the application of strong electric field (a high positive voltage) at the surface of a metal is known as field Emission.
- In this method, a strong electric field i.e. a high positive voltage is applied at metal surface which pulls the free electrons out of metal.
- The stronger the electric field, the greater is the electron emission.

(3) Photo electric emission:

- The process of electron emission from a metallic surface by the application of light, is known as photo electric emission.
- The emitted electrons are known as photo electrons.
- The greater the intensity of Light falling on the metal surface, the greater is the photo electron emission.

(4) Secondary Emission:

- The process of electron emission from a metallic surface by the bombardment of high speed electron, is known as Secondary Emission.
- The high speed electron are known as primary electrons.
- The emitted electrons are known as secondary electrons.