

Sub:- Analog Electronics (Lectur-1)
Branch - Electrical Engg IyR(M)

Electronics:- It is the branch of engineer
which deals with current conduct
through a vacuum or gas or vac semi-
conductor.

Importance:- The electronic devices are
capable of performing various functions @
such as:-

- 1) Rectification
- 2) Amplification
- 3) Automatic control
- 4) Conversion of D.C. into
A.C. (Oscillators)
- 5) Conversion of light into electricity
- 6) Conversion of electricity into light.

Introduction ch-1 → semiconductor physics

Semiconductor:- A semiconductor is a substance
at room temperature. As a result,
under the influence of potential difference,
semiconductors practically conduct no
current.

OR
A semiconductor material have conductivity
between metal and insulator.
eg → Group IV element are semiconductors
such as carbon, silicon and Germanium

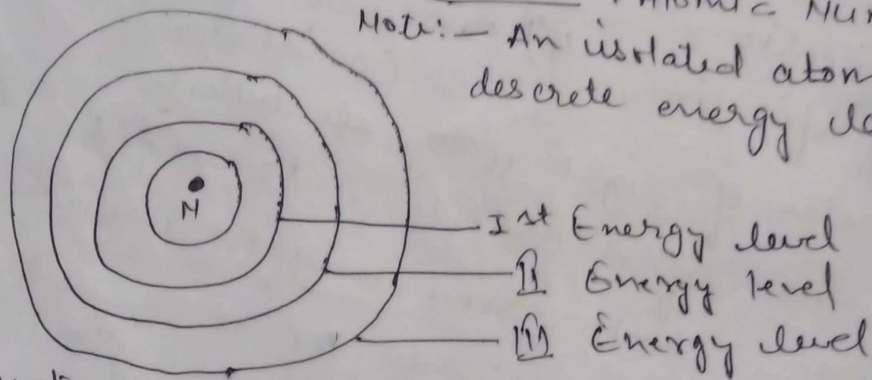
Silicon and Germanium are two popular semi conductors and widely used in electronics Engg.

Element	Atomic No	Configuration
C	6	$1s^2 2s^2 2p^2$
Si	14	$1s^2 2s^2 2p^6 3s^2 3p^2$
Ge	32	$1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^2 4p^2$
Sn	50	$1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^2 4p^4 4d^{10} 5s^2 5p^2$

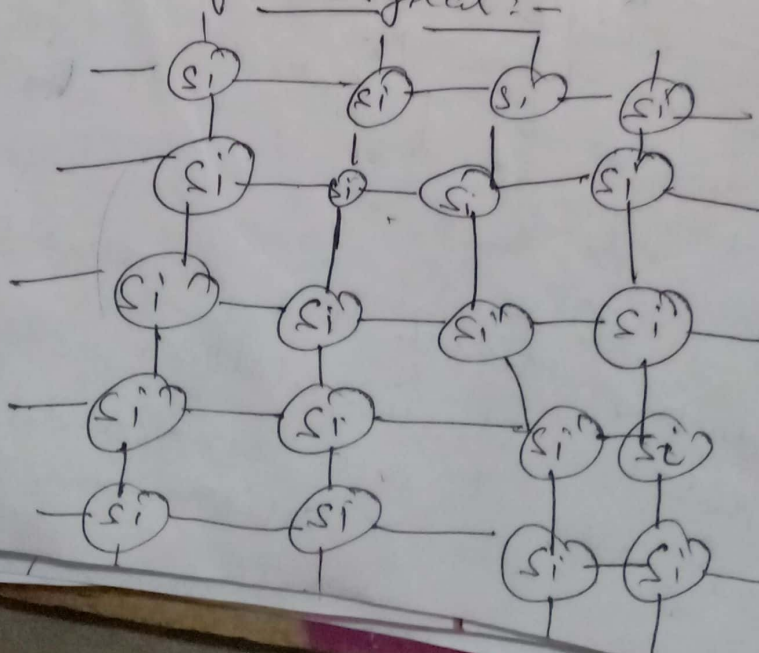
Structure of Si atom

: Atomic Number = 14

Note: - An isolated atom have discrete energy levels.



Structure of Si crystal :-



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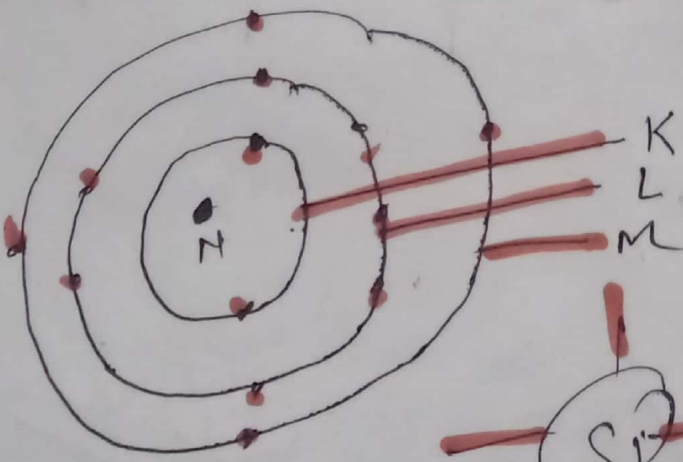
ANALOG ELECTRONIC

INTRODUCTION TO SEMICONDUCTORS:-

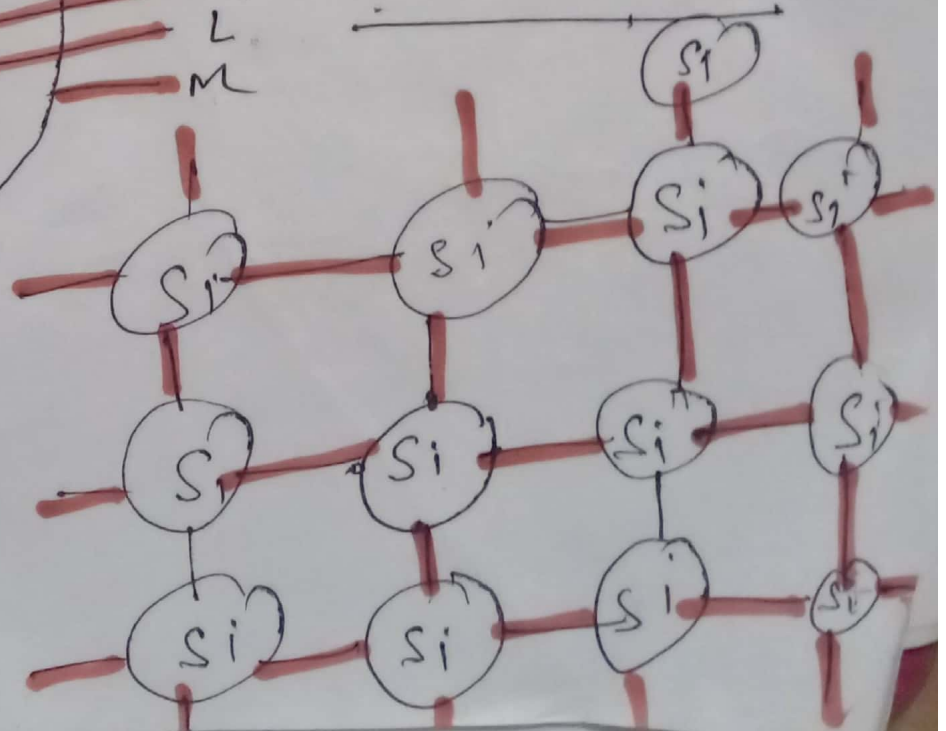
Conductivity
 Conductors < S.C. < Insulators

Group IV
 C
 Si
 Ge
 Sn } S.C.
 Silicon (Si) and Germanium (Ge) are two S.C. that are widely used in making Electronic devices.

Si - Atomic No: - 14
 E.C. - 2, 8, 4 } 4e-
 4 valency



Bohr's Atomic Model



Ge - 32
 Valency = 4
 O.B = 4e-

Germanium
crystal
structure →

