Gr. H Raisoni College of Engineering and Management, Pune

F.Y B.Tech (Engineering)
FIRST TERM 2020-21
CAE-II (2020 Pattern)

Department - Information Technology (IT)
Term/Section - Term I
Date of Examination - 06/04/2021
Subject Name/Code - Engineering Physics
Roll NO - C70 Name - Swayam Pramod Torode

CO3 a) Elaborate the different characteristics of LASER.

Answer: LASER means Light Amplification by the Stimulated Emission of Radiation.

The different characteristics of LASER:

(i) The Laser light is monochromatic, directional, and coherent. The light emitted from laser is monochromatic, that is, its of one wavelength (color). In contrast, ordinary white light is a combination of many different wavelengths (colors).

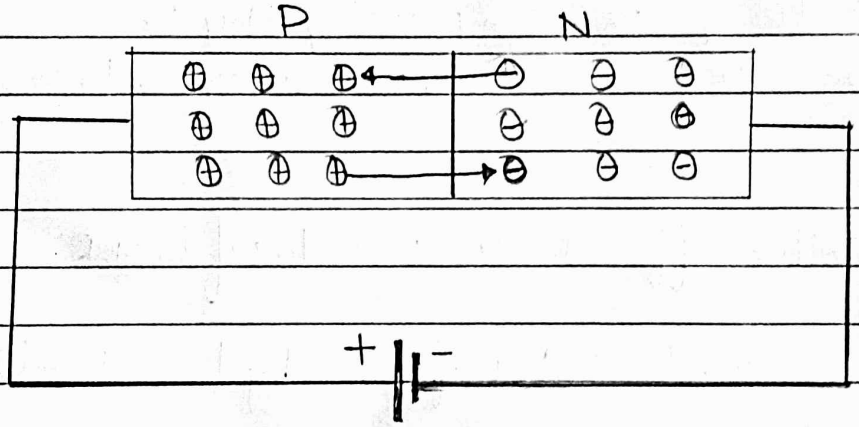
(ii) Leaser emit light that is highly directional.

(ii) The light from the leaser is coherent, which means the wavelengths of the laser light are in phase in space and time.

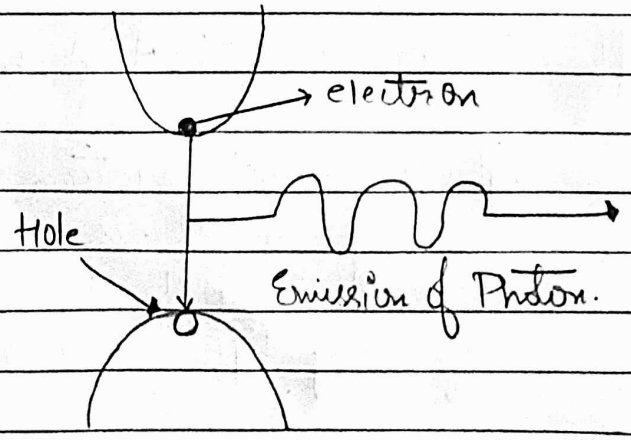
It is highly intense.

b.) Draw the constructional diagram of Semiconductor diode Laser and explain it.

Answer: It is specifically fabricated p-n junction diode. This diode emits laser light when it is forward biased.



fig(a)



fig(b)

Working:

When the PN junction is forward biased with large applied voltage, the electrons and holes are injected into junction region in considerable concentration.

The region around the junction contains a large amount of e^- in the conduction band and a large amount of holes in the valence band.

When the forward-biased voltage is increased, more and more light photons are emitted and the light production instantly becomes stronger.

After gaining enough strength, it gives out the laser beam of wavelength 8400 Å. The wavelength of laser is given by

$E_g = h\upsilon = h\frac{c}{\lambda} \Rightarrow \lambda = \frac{hc}{E_g}$ where E_g = band gap energy in J.

d.) i) temporal coherence: It is the measure of the average correlation between the value of a waves and itself delayed by T, at any pairs of times.

In other words, it characterizes how well a wave can interference with itself at a different time.

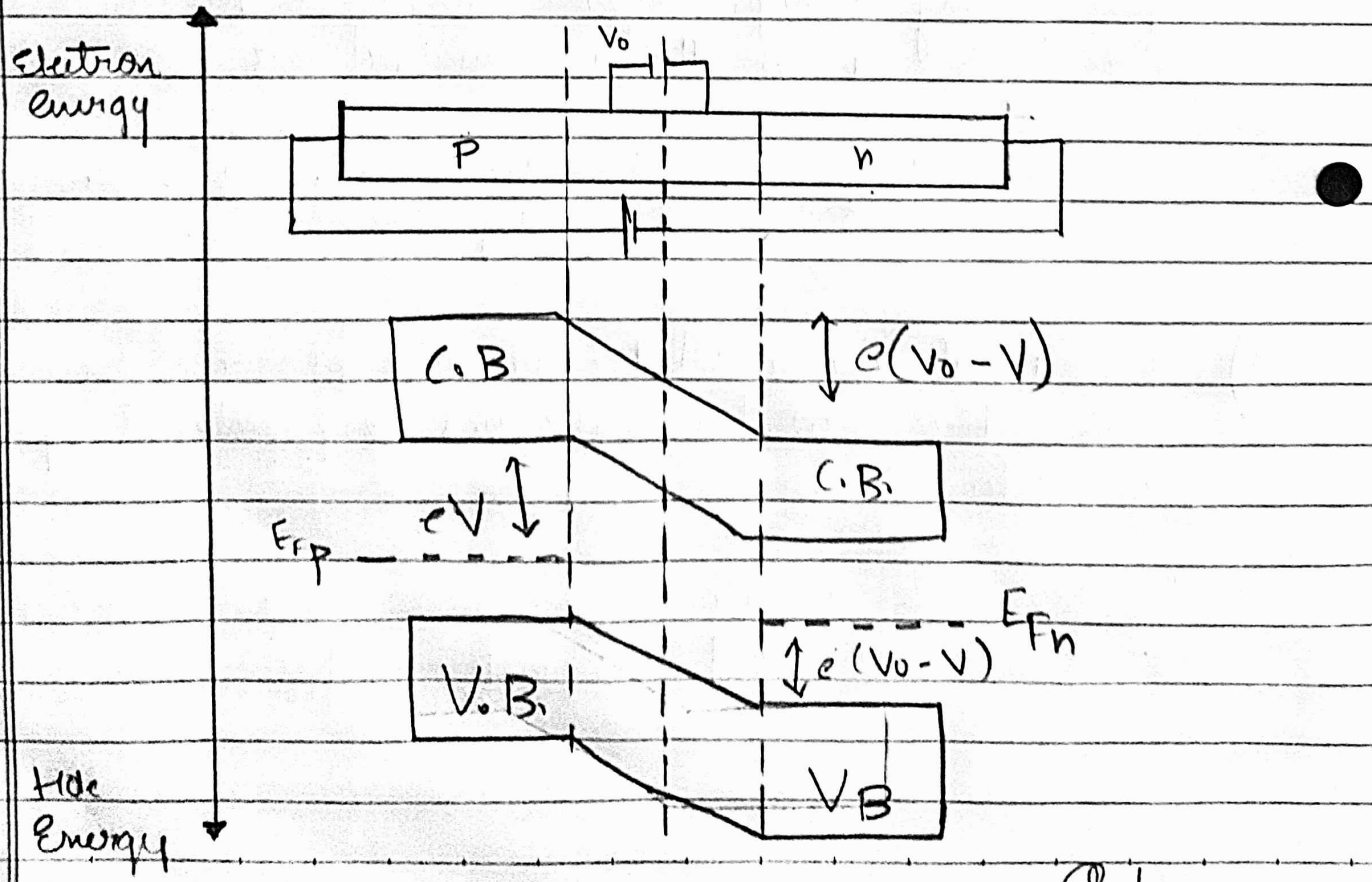
ii) Spatial Coherence: It describes the correlation between waves at different points in space, either lateral or longitudinal. It also describes the correlation between waves observed at different moments in time.

iii) Einstein Coefficient:

Einstein Coefficient are mathematical quantities which are measure of the probability of absorption or emission of light by an atom or molecule.

04 a) Draw energy band diagram for PN junction diode in forward biased mode label it properly.

Answer:



b) Brief about OLED and its applications.

Answer: OLEDs – Organic-light-Emitting diodes. OLEDs are thin-film organic semiconductor between two electrodes. Light is generated when holes and electrons injected at electrodes recombine.

Applications of OLED:

1. High-end television System.
2. Computer monitor.
3. Android Phones.
4. Digital Cameras
5. Media Players