

Summary report on WIT & WIL

Name of the Faculty: Dr.T.Rajani Name of the Subject: Engineering Physics

Class/Section: ECE-IV Date: 16-04-2019

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| Sl.No. | Particulars | To be filled |
| 1. | Grid Reference No. | 6.3 |
| 2. | Scenario Reference No.  (Mapping with syllabus) |  |
| 3. | Topic covered in every class | LED |
| 4. | Brief write-up (500 words) for every class: LEDs were invented by Nick Holonyak Jr. in the year 1962. When we apply a voltage across a pn junction resulting in a diode current , which inturn can produce photons and a light output. This mechanism is called “injection electroluminescence”. This device is known as **L**ight **E**mitting **D**iode (LED). The electronic symbol of LED is shown below figure  LED symbol.svg  **Construction:**  The typical construction of LED has to be designed and constructed in such a way that most of the radiative recombinations takes placefrom the side of junction nearest to the surface so that loss due to reabsorption is minimized. For this , PN junction layer has to be parallel and closer to the surface layer. The LED constructed on a n-doped substrate (generally Gallium Phosphate (GaP)). A thin epitaxial p-doped GaP layer is grown on the top of this substrate. Electrical contacts are made leaving as much of the upper surface of the p-material uncovered. The recombination takes place and radiation generated between P and N layers i.e. PN junction. Since GaP layer is transparent , the radiation escapes through the top layer. To the bottom electrode a reflective layer is added to improve the efficiency.  We know that  Here E= Ec-Ev Then,  and  then  So, wavelength of LED is depends on Energy gap of a diode.  **Advantages of LED’s**   * Very low voltage and current are enough to drive the LED. * Voltage range – 1 to 2 volts. * Current – 5 to 20 milliamperes. * Total power output will be less than 150 milliwatts. * The response time is very less – only about 10 nanoseconds. * The device does not need any heating and warm up time. * Miniature in size and hence light weight. * Have a rugged construction and hence can withstand shock and vibrations. * An LED has a life span of more than 20 years.   **Disadvantages**   * A slight excess in voltage or current can damage the device. * The device is known to have a much wider bandwidth compared to the laser. * The temperature depends on the radiant output power and wavelength. | |
| 5. | Relevant additional illustration any |  |
| 6. | Video links / Web links if any |  |
| 7. | Signature of Repository Administrator |  |