

## CERTIFICATE COURSE 2018-19

Department Conducts a Certificate course on “LED BULB ASSEMBLING, USAGE AND APPLICATIONS”. The Duration of the Course is 30 hours. This course will provide the students an idea of basics of LED bulbs and practical sessions on assembling and service of LED bulbs.

### SYLLABUS

#### MODULE I

**10 hours**

Diodes- basic concepts, Biasing-forward bias and reverse bias, Introduction to LEDs, Semiconductor LEDs- How do they Work, LED's basic theory, LED Voltage Voltage and current, Advantages and disadvantages of LED

#### MODULE II

**10hours**

Multicolour LEDs, White LED, Physics of White LED, White LED no heat, Blue LED- History of Revolutions, LEDs Lighting and Potential for energy savings, Applications of LEDs- Power indicator, seven segment display, why LED lights so good, Organic LEDs

#### MODULE III – Practical Session

**10 hours**

How to assemble LEDbulbs, Discussion of the circuits , Fabrication of the LED bulbs

#### Text book for study

1. Principles of Electronics- V.K Metha- S . Chand Publication
2. Principles and Applications of Organic Light Emitting Diodes (OLEDs) Thejo Kalyani, Hendrik Swart and S.J. Dhoble-Wiley Publication
3. Understanding LED Illumination – M. Nisa Khan
4. Integrated Electronics- Jacob Millman, Christos Halkias ,Chetan D. Parikh- second edition

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ANDHRA CHRISTIAN COLLEGE GUNTUR  
DEPARTMENT OF PHYSICS

Academic year 2018-19

TOPIC - LED BULB ASSEMBLING

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R.NO 636

Answer all Questions. Each question carries ONE Mark

Max Marks-20M

Time -1 hour

1. In LEDs, light is emitted when \_\_\_\_\_

- a. Electrons recombine with electrons
- b. Electrons recombine with holes
- c. Electrons do not recombine
- d. None of the above

17  
20  
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✓ (b)

2. Which of the following produce the current when it absorbs photons?

- a. Transducer
- b. LED
- c. Photodiode
- d. LCD

✓ (c)

3. LEDs work on the principle of \_\_\_\_\_.

- a. Electromagnetic induction
- b. Conduction
- c. Electroluminescence
- d. Induction

✓ (c)

4. State true or false: High warm-up time is needed for LEDs.

- a. TRUE
- b. FALSE

✓ (b)

5. In local dimming, LEDs are dimmed \_\_\_\_\_.

- a. Together
- b. Independently

~~(b)~~ ✓

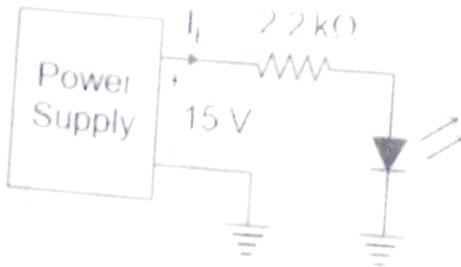
6. Aluminium alloys are used to obtain \_\_\_\_\_ light.

- a. Red
- b. Orange
- c. Yellow

✗ (b)

d. All of the above

7. What is the current passing through the led in the following circuit, assuming it has a voltage drop of 2V?



- a. 5.91 mA  
b. 8.72 mA  
c. 3.72 mA  
d. 5.27 Ma

8. A light-emitting diode(LED) converts:

- a. Optical signal into thermal energy  
b. Thermal energy into electrical energy  
c. Electrical current into optical signal  
d. Sound energy into optical signal

9. What value of a series resistor is required to limit the current through an LED to 20 mA with a forward voltage drop of 2.0 V, when connected to a 10-V supply

- a.  $600\ \Omega$   
b.  $200\ \Omega$   
c.  $800\ \Omega$   
d.  $400\ \Omega$

10. If the speed of light in air is represented by  $e$  and the speed in a medium is  $u$ , then the refractive index of the medium can be calculated using the formula \_\_\_\_\_

- a.  $u/e$   
b.  $e/u$   
c.  $e/(2u)$   
d.  $(e-u)/e$

11. If a RED/ GREEN multi color LED is switched fast enough between two polarities, it will produce \_\_\_\_\_ colour.

- a. Green  
b. Orange  
c. Red  
d. Yellow

12. Which of the following statements about LED is in correct?

- a. It needs small power for operation
- b. It emits light
- c. It uses materials like gallium and arsenide
- d. It uses materials like silicon and germanium

13. Red (R), Green (G) and Blue (B) Light Emitting Diodes (LEDs) were fabricated using p-n junctions of three different inorganic semiconductors having different band-gaps. The built-in voltages of red, green and blue diodes are  $V_R$ ,  $V_G$  and  $V_B$ , respectively. Assume donor and acceptor doping to be the same ( $N_A$  and  $N_D$ , respectively) in the p and n sides of all the three diodes. Which one of the following relationships about the built-in voltages is TRUE? (b)

- a.  $V_R > V_G > V_B$
- b.  $V_R < V_G < V_B$
- c.  $V_R = V_G = V_B$
- d.  $V_R > V_G < V_B$

14. The basic material for fabrication of an LED is

- a. gallium arsenide
- b. gallium arsenide phosphide
- c. indium antimonide
- d. indium antimonide phosphide

15. Which of the following semiconductor compound is not used in the construction of Light Emitting Diodes?

- a. GaAs
- b. GaP
- c. GaSe
- d. GaN

16. Identify the diode for which the above symbol is used.



- a. Varactor diode
  - b. Light emitting diode
  - c. Photo diode
  - d. Blocking diode
17. An LED has a rating of 2 V and 10 mA. If it is connected to a 6V battery, the minimum value of series resistance is (d)
- a. 40  $\Omega$
  - b. 100  $\Omega$
  - c. 200  $\Omega$
  - d. 400  $\Omega$
18. The colour of the emitted light from the P-N junction made of GaAsP is (a)
- a. Red or yellow.
  - b. Far infrared.
  - c. Near infrared.
  - d. Ultraviolet.
19. RGB LED consists of \_\_\_\_\_ LED. (b)
- a. Two red, one green and one blue
  - b. One red, two green and one brown
  - c. One red, one green and one blue
  - d. two red, two green and two blue
20. As compared to an LED, an LCD has the distinct advantage of (a)
- a. Extremely low power consumption
  - b. Providing a silver display
  - c. Being extremely thin
  - d. Giving two types of displays