

M.TECH.
(SEM-II) THEORY EXAMINATION 2017-18
OPTOELECTRONICS

Time: 3 Hours**Total Marks: 100****Note:** Attempt all Sections. If require any missing data; then choose suitably.**SECTION A****1. Attempt *all* questions in brief. 2 x 10 = 20**

- a. Mention some important LED materials.
- b. What are the advantages of monolithic opto electronic integration?
- c. What are the advantages of liquid crystal display?]
- d. What is meant by contact potential at the p-n junction?
- e. What is meant by laser action?
- f. Define internal quantum efficiency of a laser?
- g. How does the LED Work?
- h. What is a photodiode?
- i. Define V-number of fiber.
- j. What is the condition for total internal reflection?

SECTION B**2. Attempt any *three* of the following: 10 x 3 = 30**

- a. Explain the operation of LED and derive an expression for the frequency response and bandwidth of an LED.
- b. Explain the self-electro-optic device?
- c. Explain avalanche photo diode and also explain effect of temperature on avalanche gain.
- d. Explain the working of semiconductor laser. What is threshold condition for lasing action?
- e. Explain the principle and operation of wave guide coupler, interferometer and active directional coupler switch.

SECTION C**3. Attempt any *one* part of the following: 10 x 1 = 10**

- (a) What are the major advantages of LED over LCD?
- (b) Discuss in detail the principle and operation of a photonic switch based on Self electro optic Device (SEED).

4. Attempt any *one* part of the following: 10 x 1 = 10

- (a) Explain the self-electro-optic device?
- (b) Give the principle and design of optical amplifiers.

- 5. Attempt any *one* part of the following: 10 x 1 = 10**
- (a) What are optical sensors describe different types of optical sensors and applications.
 - (b) Explain various requirement of optical detector. Explain the working principle of PIN diode.
- 6. Attempt any *one* part of the following: 10 x 1 = 10**
- (a) Discuss the different types of noises in the photodiodes.
 - (b) With a neat diagram, enumerate the different mechanisms that contribute to attenuation in optical fiber.
- 7. Attempt any *one* part of the following: 10 x 1 = 10**
- (a) What are the various advantages of optical fiber communication system?
 - (b) Discuss the theory of laser emission and population inversion.