

**End Semester Examinations - 2015-16 Even Semester - May 2016**

**14EC2046 Optoelectronics**

**Set B**

**Time : 3 hrs**  
**Total Marks: 100**

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1. a. Give the relationship between electric and magnetic field in optical wave equation? (15)  
b. What are the conditions to obtain coherent wave trains required for the observation of Interference? (5)
- OR**
2. a. Elucidate about the optical phenomena of Luminescence. Explain different types of Luminescence. (5)  
b. Explain about Photoluminescence principle with the help of schematic diagram of energy levels. (10).  
c. What are the techniques followed to overcome the radiation losses in the construction of LED? (5)
3. a. Draw the structure of LED and explain its working principle of an electroluminescence in detail. (15)  
b. For a GaAs/Glass LED interface  $n_1=3.6, n_2=1.5$ , then calculate the fractional transmission for an isotropic radiation inside the GaAs and the critical angle. (5)
- OR**
4. a. Obtain the expression for threshold condition for amplification in Laser cavity. (10)  
b. Discuss the theory of mode locking in Laser and explain about active and passive mode locking. (10)
5. a. Explicate the working principle of thermoelectric detector with necessary diagram. (10)  
b. Draw the equivalent circuit diagram of a photodiode with different modes and derive the external voltage equation. (10)
- OR**
6. a. Obtain the expression of photo conductive gain for a slab of photoconductive material. (10)  
b. Explicate the working principle of pyroelectric detector with necessary diagram. (10)
7. a. Discuss about the Birefringence and the Electro optic effect with application to phase modulation with necessary equations and diagram. (15)  
b. Draw the schematic illustration of optical fiber communication and explain the process. (5)
- OR**
8. a. Draw the schematic illustration of acousto-optic modulation and explain the process of wave propagation ? (12)

b. Draw the schematic block diagram of an optoelectronic phased array antenna system. (8)

9. a. Elucidate the techniques for fabricating waveguides with necessary diagrams. (10)

b. Brief about the principle forms of optoelectronic integration with their relative merits and demerits. (10)

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**Wishing you All the Best**

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