

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

14EC2046 Optoelectronics

Set A

Time : 3 hrs
Total Marks: 100

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1. a. Calculate the Brewster angle of or glass given that its reractive index in air is 1.5?
Assume glass interace with air $n=1$. (5)
- b. Discuss the wave nature of light and describe polarization, interference and diffraction with suitable example. (15)
- OR**
2. a.Explain about Photoluminescence principle with the help of schematic diagram of energy levels. (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)
3. a. Draw the structure of LED and explain its working principle of an electrolumniscence in detail. (15)
- b. How will you generate a population inversion? What are the different level systems of a LASER? (5)
- OR**
4. a. Discuss the theory of mode locking in Laser and explain about active and passive mode locking. (10)
- b. Explain the process of Laser Emission, Absorption, radiation and population inversion with necessary diagrams. (10)
5. a. Draw the wheatstone bridge circuit and explian the bolometer operation based on α temperature coefficent of resistance. (10)
- b. Derive the expression for photoconductive gain of a semiconductor slab material. (10)
- OR**
6. a. Draw the equivalent circuit diagram of a photodiode with different modes and derive the External voltage equation. (10)
- b. State the importance of pneumatic detectros and discuss the radiation power measurment using Golay cell detectors. (10)
7. a. Elaborate the operation of magneto optic devices and discuss its merits in detail. (13)
- b. Give the different types of modulation techniques and its importance in optical communication? (7)

OR

8. a. Enumerate the needs for optical switching and draw the schematics of wave length division switching system. (5)
- b. Elucidate about the need for OEIC and the different forms of fabrication. (15)
9. a. Describe the importance of optoelectronic integrated circuits in real time applications with examples. (13)
- b. Draw the schematic of guided wave Mach-Zehnder interferometer with couplers and explain the operation. (7)

Wishing you All the Best
