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Reg. No. : .....

Name : .....

Seventh Semester B.Tech. Degree Examination, November 2015
(2008 Scheme)
08.735 : OPTO ELECTRONIC DEVICES (TA)
(Elective – III)

Time : 3 Hours Max. Marks : 100

JOHN COX MEMORIAL CSI INSTITUTE OF TECHNOLOGY
TRIVANDRUM-11
KANNAMMOOLA

PART – A

Answer **all** questions **each** carries **4** marks.

1. Briefly explain exciton recombination.
2. Mention the optical properties of photonic band gap materials.
3. Compare the performance of characteristics of p-i-n diode and pn photodiode.
4. The quantum efficiency of an InGaAsP/InP avalanche photodiode is 80% when detecting 1.3 μm radiation with an incident optical power of 1 μW, the output current of device is 20 μA. Calculate the avalanche gain or current multiplication factor of the device.
5. What are the important factors to be considered white designing a solar cell ?
6. Explain the operation of thin film solar cells.
7. What is the significance of balanced modulator in coherent detection ?
8. Could a quantum well be used to fabricate a very far IR laser. If so what would be principle of operation.
9. Describe the process of spontaneous emission, super radiance and stimulated emission.
10. Describe the basic requirements for lasing and how they are achieved in a semiconductor laser. **(10×4=40Marks)**

P.T.O.

PART – B

Answer **two** questions from **each** module. **Each** question carries **10** marks.

Module – I

11. How can we measure absorption and luminescence spectra of a semi conductor and explain time resolved photo luminescence ?

12. Briefly explain the absorption and radiation mechanisms in a semi conductor.

13. Explain the operation of avalanche photodiodes in detail with necessary equation.

Module – II

14. Explain the operation of solar cell with its construction, V-I characteristics and its spectral response.

15. Briefly explain about micro cavity photodiode and hetero junction photodiode.

16. Explain the frequency response, defects and reliability of LED.

Module – III

17. Derive the Einstein's relation and population inversion.

18. Explain the operating principles of friction laser and its threshold current with all necessary equation.

19. Explain in detail the lasing condition and gain in a semiconductor. **(6×10=60Marks)**
