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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

SEVENTH SEMESTER B.TECH DEGREE EXAMINATION(S), MAY 2019

Course Code: EC469

Course Name: OPTO ELECTRONIC DEVICES

Max. Marks: 100 Duration: 3 Hours

PART A

Answer any two full questions, each carries 15 marks. Marks

1 a) Explain Franz-Keldysh effect in semiconductors with necessary diagrams? (5)

b) Explain the types of semiconductors based on band gap structures with relevant diagrams. (10)

2 a) Discuss deep level transitions in semiconductor (5)

b) What are QW lasers? Explain its constructional features (10)

3 a) Discuss axial and transverse modes in laser (5)

b) Explain working principle of DFB laser with the aid of suitable diagram (10)

PART B

Answer any two full questions, each carries 15 marks.

4 a) What is the basic principle of white LED (5)

b) Describe the structure and working of InGaN/GaN laser diodes (10)

5 a) Discuss the principle of optical memory (5)

b) Explain the working principle of electro-optic modulators with suitable diagrams (10)

6 a) Explain the principle of white light LED, based on phosphor converters (5)

b) What is meant by acousto-optic effect? Explain Raman-Nath modulator (10)

PART C

Answer any two full questions, each carries 20 marks.

7 a) Explain the principle of organic LED (5)

b) Draw the structure of Schottky barrier photodiode and give an application (7)

c) A silicon APD has a quantum efficiency of 65% at a wavelength of 900nm.Suppose a 0.5μW of optical power produces a multiplied photocurrent of 10μA,find the multiplication factor M. (8)

8 a) Explain the principle of attenuators (5)

b) Discuss the principle of tunable optical filters (7)

c) Explain the principle of operation of a 1:1 fiber optic directional coupler with a (8)

diagram

9 a) Explain working principle of circulator with neat sketch (5)

b) Discuss the construction and working principle of PIN photodiode (7)

c) An InGaAs APD has a quantum efficiency of 60% at 1.55μm in the absence of multiplication. It is biased to operate with M=12.Calculate the photocurrent if the incident optical power is 20nW.What is the responsivity when M=12? (8)

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