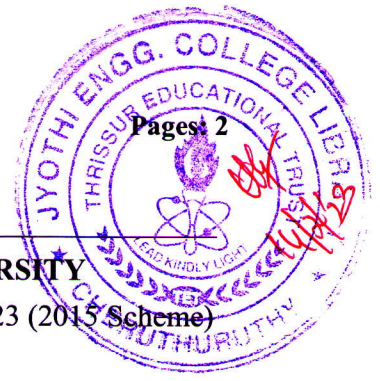


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Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Seventh Semester B.Tech Degree (S, FE) Examination January 2023 (2015 Scheme)

Course Code: EC469

Course Name: OPTOELECTRONIC DEVICES

Max. Marks: 100

Duration: 3 Hours

PART A

Answer any two full questions, each carries 15 marks.

Marks

- 1 a) Describe the absorption in Quantum well using QCSE. (10)
- b) Determine the cut off wavelength for a GaAs Semiconductor material whose band gap is 1.43eV at 300 K. (5)
- 2 a) Explain the working principle of DFB lasers with suitable diagrams. (10)
- b) Describe the role of Fabry-Perot cavity in lasing operation. (5)
- 3 a) Differentiate between direct and indirect bandgap materials. (8)
- b) The longitudinal modes of InP injection laser emitting at a wavelength of 940 nm are separated by 300 GHz. Determine the length of the optical cavity and the number of longitudinal modes emitted. The refractive index of InP is 3.3. (7)

PART B

Answer any two full questions, each carries 15 marks.

- 4 a) Explain the working principle of electro-optic modulators with suitable diagrams (10)
- b) Explain the concept of optical memory. (5)
- 5 a) Explain the desirable properties of nitride materials. (10)
- b) With the help of an emission spectrum, explain the generation of white light by trichromatic sources. (5)
- 6 a) Describe the structure and working of InGaN/GaN light emitting diodes (7)
- b) Explain the structure and working of Quantum well electro-absorption modulator. (8)

PART C

Answer any two full questions, each carries 20 marks.

- 7 a) A silicon PIN photodiode has an active light receiving area of diameter 0.4mm. (10)
When radiation of wavelength 700nm and intensity 0.1 mW/cm² is incident , it

generates a photocurrent of 56.6nA. What is the responsivity and quantum efficiency of the photo diode at 700nm?

- b) Discuss the role of tunable filters in optical network. Also, mention its applications. (10)
- 8
- a) Distinguish between attenuators and isolators used in optical communication networks. (10)
 - c) Explain the structure and working of TFT display. (10)
- 9
- a) Explain the switching elements used in optical cross connects. (10)
 - b) Explain the working of organic LED with structural diagram. (10)
