Reg. No. : [　　　　　　　　　　　]

Question Paper Code : 52898

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2019.

Sixth Semester

Electronics and Communication Engineering

EC 6016 — OPTO ELECTRONIC DEVICES

(Common to Medical Electronics)

(Regulation 2013)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is the significance of interference pattern?

2. State the need for polarization in light wave propagation.

3. What is the concept of ILD?

4. What is population inversion?

5. Define Responsivity of an optical detector.

6. The photo detector output in a cutback-attenuation set up is 3.3 mV at the far end of the fiber. After cutting the fiber at the near end, 5 m from the far end photo detector output read was 9.2 mV. Find the attenuation of the fiber in dB/Km.

7. Which is the oldest and most commonly used modulation technique? Reason it out.

8. What is the principle of Acousto optic modulator?

9. What are the fabrication steps of OEICs?

10. Mention any three guided wave devices and their characteristics.

PART B — (5 × 13 = 65 marks)

11. (a) (i) State and explain Snell's law. (6)

    (ii) Define Polarization. Explain the significance and types of polarization in detail. (7)

Or

    (b) (i) Explain the concept of light wave propagation with diagrams. (5)

    (ii) Discuss the concept of quantum mechanics and its role in Opto electronic devices. (8)

12. (a) (i) What is luminescence? Explain photo luminescence and electro luminescence. (8)

    (ii) For a hetero junction semiconductor laser, the band gap of the semiconductor used is 1.42 eV. By doping, the band gap of the semiconductor is increased by 0.25 eV. Calculate the change in the wavelength of the laser. (5)

Or

    (b) (i) Discuss any four potential applications of 3 level and 4 level lasers with diagrams. (6)

    (ii) Explain the different types of cavities for Lasers. Derive the threshold condition for semiconductor lasing. (7)

13. (a) (i) Draw APD and PIN photodiodes. Explain their operating principles. Differentiate APD from PIN photo diode. (10)

    (ii) Derive SNR for PIN photo diode. (3)

Or

    (b) (i) Explain the concept of photo multiplier tube with a diagram. (5)

    (ii) Write technical notes on (8)

        (1) Multicavity photodiode

        (2) Schottky barrier photodiode.

14. (a) (i) Explain the concepts of quantum well electro absorption modulators with diagram. (6)

    (ii) Draw a neat sketch of Eye pattern and explain its significance with an example. (7)

Or

    (b) (i) Explain the construction and operating principle of Franz- Keldysh modulator with a diagram. (6)

    (ii) Write short note on "Optical logic Gates". (7)

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15. (a) (i) Differentiate Hybrid from monolithic integration. (6)

      (ii) Discuss the concept of optical control of microwave oscillators with diagrams. (7)

Or

   (b) (i) Enumerate the guided wave devices. Explain the construction and concepts of any two devices. (6)

      (ii) Explain the requirements of ideal integrated transmitters and receivers. (7)

PART C — (1 × 15 = 15 marks)

16. (a) Explain the working of the following display devices

      (i) LED Display (5)

      (ii) LCD Display (5)

      (iii) Plasma Display. (5)

Or

   (b) (i) Explain in detail about the Analog Modulation and digital modulation of Optical Signals. (8)

      (ii) Discuss the electro Optic Modulator working. (7)

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