

M.Sc. DEGREE EXAMINATION, JANUARY 2016**Third Semester****Faculty of Science****Branch II—Physics-A-Pure Physics****Paper XII—Special Paper II—A-ELECTRONICS-OPTO—ELECTRONICS****(Common with E-Opto-Electronics)****[Prior to 2012 Admissions]****Time : Three Hours****Maximum : 75 Marks****Part A**

*Answer any six questions.
Each question carries 2 marks.*

1. Obtain the principle of Quantum Well laser.
2. Explain electroluminescence display.
3. Explain the action of a photo transistor.
4. What is passive Q-switching ? Explain.
5. Explain four wave mixing.
6. Explain optical phase conjugation.
7. What are the functions of directional couplers ?
8. Explain discrete Hilbert transform.
9. What is a FIR filter ? Explain.

(6 × 2 = 12 marks)**Part B**

*Answer any three questions.
Each question carries 5 marks.*

10. Describe the functioning of a gain guided lasers.
11. Give an account on acousto optic modulators.
12. Discuss the phenomenon and theory of parametric oscillations.
13. Briefly discuss the theory of planar 2D wave guides.
14. Explain graded index 3D wave guide devices.

(3 × 5 = 15 marks)**Turn over**

Part C

Answer all questions.

Each question carries 12 marks.

15. (a) Discuss the structure and characteristics of homo junction and hetero junction lasers.

Or

- (b) Discuss the design and salient features of LED.

16. (a) Discuss the theory of Q-switching with applications.

Or

- (b) Discuss the phenomenon non-linear polarization and bring out the theory of second harmonic generation.

17. (a) Discuss on step index and graded index 2D wave guide devices.

Or

- (b) Discuss the TE modes of a symmetric step index planar wave guide.

18. (a) Discuss the linearity and time scaling properties of Fourier transform with applications.

Or

- (b) Discuss on IIR filters with salient features.

(4 × 12 = 48 marks)