

M.Sc. (Physics) (NEP Pattern) Semester-II  
**02MSCPH4-1 (DSE-1) Paper-IV - Advanced Optoelectronics**

P. Pages : 2

Time : Three Hours



**GUG/S/25/15418**

Max. Marks : 80

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**Either:**

1. a) Explain following terms 8  
(i) Total internal reflection  
(ii) Acceptance angle and  
(iii) Numerical aperture.
- b) Explain the concept of modes and define electromagnetic mode in step index optical fibre. 8

**OR**

- e) What is the meaning of wave guide? Explain plain wave guide and concept of normalized frequency. 8
- f) Explain the concept of dispersion in fiber optics. 8

**Either:**

2. a) What is the meaning of luminescence? Give the principle of electroluminescence and explain types of luminescence with suitable example. 8
- b) Explain in details construction and working of LED. 8

**OR**

- e) Explain in details semiconductor laser. 8
- f) Discuss in details operation of photo-detector and types of photo detector. 8

**Either:**

3. a) Define the quality factor and explain the transverse and longitudinal modes of selection. 8
- b) Explain in details Q-switching peak power, total energy and pulse duration for Q-switching. 8

**OR**

- e) Explain the mechanical principle of electro ,optic and acoustic optic. 8
- f) Discuss the in details types of lasers and application of laser. 8

**Either:**

4. a) What is the modulation? Explain conversion of signals A/D and D/A. 8
- b) Explain in details wave guiding layers sputtering and dipping. 8

**OR**

- e) Discuss in details phase and polarization fiber sensors and its types. 8
- f) Explain the term substrate and cleaning of substrate and sagnac effect. 8

5. Attempt all the followings.

- a) Give application of-Optical fiber. 4
- b) Discuss the types of photo detector. 4
- c) Explain properties of laser. 4
- d) Explain the quantisation and polarization. 4

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