A–0440

Total Pages : 3 **Roll No. .....**

MSCPH-551

Master of Science Physics (MSCPH)

Optoelectronics

Examination, June 2025

Time : 2:00 Hrs. Max. Marks : 70

Note* :–** This paper is of Seventy (70) marks divided into Two (02) Sections 'A' and 'B'. Attempt the questions contained in these Sections according to the detailed instructions given therein. ***Candidates should limit their answers to the questions on the given answer sheet. No additional (B) answer sheet will be issued.

Section–A

Long Answer Type Questions 2×19=38

***Note* :–** Section 'A' contains Five (05) Long-answer type questions of Nineteen (19) marks each. Learners are required to answer any *two* (02) questions only.

1. Explain working principle and characteristics of a metal-semiconductor-metal Photodiode.

2. What is Surface emitting LED. Give its structure, working and Surface advantage of Surface emitting LED?

3. What is an optical communication system ? What is the significance of the Numerical aperture of optical fiber cable ?

4. Explain the I-V characteristics of a Photovoltaic cell in detail.

5. What are Photoconductors ? Explain the working principle and characteristics of Photoconductors.

Section–B

Short Answer Type Questions 4×8=32

***Note* :–** Section 'B' contains Eight (08) Short-answer type questions of Eight (08) marks each. Learners are required to answer any *four* (04) questions only.

1. Explain *n*-type and *p*-type semiconductors. Also describe doping process in semiconductors.

2. Describe Electrical and optical pumping.

3. What do you understand by efficiency of a photovoltaic cell? Explain in detail.

4. Discuss effect of electric field on absorption. Also explain Stark effect in detail.

5. Write short note on pulse broadening optical fiber.

6. What do you understand by heterojunction diodes ? Discuss different types of heterojunction diodes.

7. What do you understand by solar Spectrum ? Explain Solar Energy Spectrum in detail.

8. What do you understand by LASER ? Explain quantum-well lasers in detail.

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