A–096

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

MSCPH-551

M.Sc. PHYSICS (MSCPH)

(Optoelectronics)

4th Semester Examination, 2024 (June)

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 the mechanism of electric conduction in a typical semiconductor like Ge and Si. How the conductivity of pure semiconductor is affected by adding traces of trivalent and pentavalent impurities ?

2. What is phototransistor ? How does it differ from an ordinary transistor and photodiode ? How can it to be converted into photodiode ?

3. What is LED ? Give its principle of working, construction and its application.

4. How does light propagate along a fibre ? Distinguish between step index and graded index fibres. Obtain an expression for numerical aperture in their cases.

5. Write short notes on the following :

   (a) Solar energy spectrum

   (b) Photovoltaic cell

   (c) Laser

   (d) Optical fibre

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 alloy semiconductors.
2. What is electric field effect on absorption in semiconductor ?
3. Describe the effect of temperature on Photovoltaic cell.
4. How the colour of LED light can be decided ?
5. Describe the construction and working of a Photovoltaic cell.
6. Discuss about various light sources for optical fibre with special references to LED and Laser diode.
7. Discuss cleaved coupled cavity Laser.
8. Explain PEN photodiodes.

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