

Total page: 2

PG CBCS
M.Sc. Semester-IV Examination, 2021
PHYSICS
PAPER: PHS 403

Full Marks: 40**Time: 2 Hours**

Write the answer for each unit in separate sheet

The figures in the right-hand margin indicate full marks.
 Candidates are required to give their answers in their own words as far as practicable

403.1: SEMICONDUCTOR DEVICES

Marks: 20

Answer any TWO questions of the following: 10×2=20

1. Consider a Bipolar Transistor under common base configuration. Find an expression of Total Emitter Current, Transport Coefficient and Injection Efficiency? 10
2. Describe the principle of Gunn Effect oscillator. Find a relation between electron temperature and lattice temperature. 5+5
3. Explain how channel can be opened in a MOSFET. Find the expression for Transconductance in the saturated region? 3+7
4. Assuming Boltzman Transport equation, find the expression of electrical conductivity of a non-degenerate semiconductor. Show the variation of mobility with temperature in the low temperature region. 8+2

403.2: APPLIED OPTICS

Marks: 20

Answer any TWO questions of the following: 10×2=20

1. Explain how light is guided by an optical fiber. Define acceptance angle and numerical aperture. How are they related to refractive indices of the core and the cladding? Mention some advantages of fibers. 10
2. Explain with diagrams the basic principle of holography. Discuss Silent features of holography. What is the use of holography? 10

(P.T.O.)

(2)

3. a) What problem appears in the signal propagation through a stepped-index optical fiber and why? How is the problem overcome?
b) With the help of block diagram, explain a typical optical fiber communication system. 10
4. (a) What is photo transistor? Explain its principle of operation and give its volt-ampere characteristics. Mention the advantage and the disadvantage of a phototransistor over a photodiode.
(b) Write a note on photodetector? 10
