Unit IV

8. Explain the principle, circuit and working of a Hartley Oscillator. **8**

9. Explain the Barkhausen criterion for sustained oscillations. **8**

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B.Sc. EXAMINATION, 2026

(Second Semester)

(Re-appear Only)

PHYSICS

Paper–II

Semiconductor Devices

Time : 3 *Hours*] [*Maximum Marks :* 40

Before answering the question-paper, candidates must ensure that they have been supplied with correct and complete question-paper. No complaint, in this regard will be entertained after the examination.

Note : Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. **1** is compulsory. All questions carry equal marks.

(Compulsory Question)

1. Short answer type questions : **4×2=8**

(a) What is meant by the energy band gap ?

(b) Why is NPN transistor preferred over PNP transistor ?

(c) What is a transistor amplifier ?

(d) How does intensity control work in a C.R.O. ?

Unit I

2. (a) What is the Hall effect ? Derive the expression for the Hall voltage and Hall coefficient.

(b) What is a photo diode ? **8**

3. (a) Explain the V-I characteristics of a Zener diode and its use as a voltage regulator.

(b) Define *n*-type and *p*-type semiconductors with examples. **8**

Unit II

4. Explain the three transistor configurations: Common Base, Common Emitter, and Common Collector and compare their properties. **8**

5. (a) Explain the working of a PNP transistor.

(b) A transistor has $\beta = 100$. If $I_C = 4.0$ mA, find I_B and I_E. **8**

Unit III

6. (a) What is coupling ? Name different types of coupling used in amplifiers.

(b) What are the advantages of negative feedback in amplifiers ? **8**

7. (a) Explain distortion in amplifiers and how it can be minimized ?

(b) Write a short note on RC coupled amplifier. **8**