

- (b) An amplifier gives output of 5V at distortion of 10% with 2mV input signal. Distortions are to be restricted to only 1% using feedback. Find the new required input signal to get the same output. 3

Unit IV

8. (a) Give the circuit diagram of Hartley oscillator. How does the circuit maintain unclamped sinusoidal oscillations ? 4
- (b) What is the role of LC tank circuit in an oscillator ? 4
9. (a) Explain the various controls of a simple CRO and use of a CRO. 6
- (b) What is Aquadag coating in a CRO ? What is its important use in the working of a CRO ? 2



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B. Sc. EXAMINATION, 2025

(Re-appear Only)

(Second Semester)

PHYSICS

Paper II

Semiconductor Devices

Time : 3 Hours

Maximum Marks : 40

Note : Attempt *Five* questions in all. Q. No. 1 is compulsory. Use of Scientific (non-programmable) calculator is allowed.

1. (a) Why emitter follower amplifier has high input impedance ?
- (b) What is Zener breakdown ?
- (c) Why we deliberately use negative feedback loops in amplifier though it reduces gain considerably ?

- (d) What is difference between P-type and N-type semiconductor ? $2 \times 4 = 8$

Unit I

2. (a) Explain the principle and construction of a solar cell. Draw its V-I characteristics. **6**
(b) A full-wave rectifier uses an LC filter with $L = 20H$ and $C = 15\mu F$. The applied voltage is $V = 200\sin(2\pi 50t)$. Find the ripple factor. **2**
3. (a) What is energy band gap ? How is it formed in a silicon crystal ? **5**
(b) Find the concentration of holes and electrons in a N-type semiconductor at room temperature if the conductivity is $300S/cm$. **3**

Unit II

4. (a) Draw a collector feedback bias circuit and find stability factor of this circuit. **3**

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- (b) Draw the circuit diagram and explain the characteristics of a CB transistor and discuss the various constants. **5**

5. (a) What is load line ? How is it obtained ? Discuss its importance. **4**
(b) What are main factors on which shifting of operating point in a transistor depends ? **4**

Unit III

6. (a) Give a detailed account of the concept of negative feedback. Explain the effect of negative feedback on the bandwidth of an amplifier. **5**
(b) Explain the sources of various distortions that may appear in amplifier. **3**
7. (a) Design a CE amplifier circuit and derive expression for its various performance parameters. **5**

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P.T.O.