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Answers to NCERT/CBSE PHYSICS Class 12(Class XII)textbook Exercise and Additional exercise

Chapter 14.

SEMICONDUCTOR ELECTRONICS

- 14.9** For a CE-transistor amplifier, the audio signal voltage across the collected resistance of $2\text{ k}\Omega$ is 2 V . Suppose the current amplification factor of the transistor is 100 , find the input signal voltage and base current, if the base resistance is $1\text{ k}\Omega$.

14.9 Given: $R_L = 2\text{ k}\Omega = 2000\Omega$

$$V_o = 2\text{ V}$$

$$\beta = 100$$

$$R_B = 1\text{ k}\Omega = 1000\Omega$$

To find: $V_{in} = ?$, $I_B = ?$

$$V_o = \Delta I_C R_L$$

$$2 = \Delta I_C (2000)$$

$$\Delta I_C = 10^{-3}\text{ A}$$

$$\beta = \left(\frac{\Delta I_C}{\Delta I_B} \right)_{V_{CE}}$$

$$100 = \frac{10^{-3}}{\Delta I_B}$$

$$\Delta I_B = 10^{-5}\text{ A}$$

$$\text{Input signal voltage } V_i = (\Delta I_B) R_i = 10^{-5} \times 10^3 = 10^{-2}\text{ V}$$