

International Islamic University Chittagong
Department of Computer Science and Engineering
B. Sc. in CSE Mid Examination, Spring - 2025
Course Code: EEE-1221 Course Title: Electronics
Total marks: 30 Time: 1 hour 30 minutes

[Answer all the questions; Figures in the right-hand margin indicate full marks.]

1. a) Suppose, an electronic device requires the same output polarity for any polarity of the ac input. Design a rectifier using two diodes to get the required output and derive the efficiency of a full-wave rectifier. 6 CO1 A
- b) A full-wave rectifier uses two diodes, the internal resistance of each diode may be assumed constant at 20Ω . The transformer r.m.s. secondary voltage from center tap to each end of secondary is 50 V and load resistance is 980Ω . Find: (i) mean load current, (ii) r.m.s. value of load current, (iii) rectifier efficiency. 4 CO3 A
2. a) Define transistor biasing. Derive expressions for collector current and collector-emitter voltage for an amplifier that uses voltage divider biasing method. 6 CO2 U

Or

Draw the three transistor configurations – Common Base, Common Emitter, and Common Collector configurations. For a Common Emitter configuration, establish the relation between α and β as given by: $\beta = \frac{\alpha}{1-\alpha}$

- b) A transistor uses voltage divider method of biasing. $R_1 = 50 \text{ k}\Omega$, $R_2 = 10 \text{ k}\Omega$ and $R_E = 1 \text{ k}\Omega$. If $V_{CC} = 12 \text{ V}$, find 4 CO3 A
 - (i) The value of I_C if $V_{BE} = 0.1 \text{ V}$.
 - (ii) The value of I_C if $V_{BE} = 0.3 \text{ V}$. Comment on the result.

Or

Determine the values of $V_{CE(OFF)}$ and $I_{C(SAT)}$ for the circuit shown in Fig. 2(b) or.

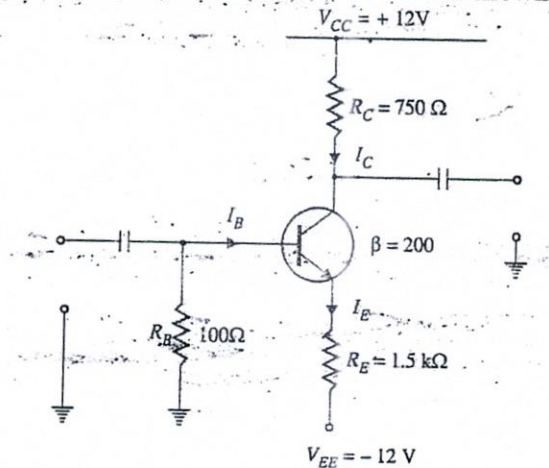


Fig. 2(b) or

3. a) Suppose, you need to design an electronic device that can perform wave shaping in such a way that it can clip out some portion of the input ac signal. Which device will you use? Define it and explain its different types with necessary figures. 7 CO2 A
- b) For the input wave to the clipping circuit shown in Fig. 3(b), find the output waveform. 3 CO3 A

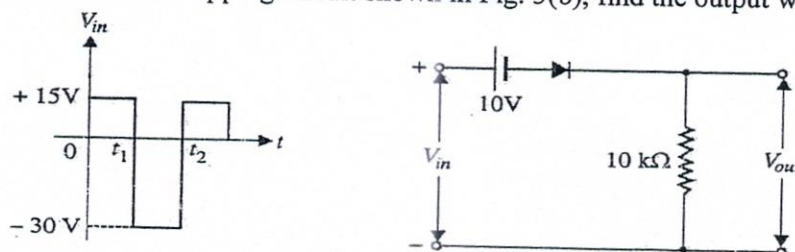


Fig. 3(b)