

**International Islamic University Chittagong**  
**Department of Computer Science and Engineering**  
*B. Sc. in CSE Mid Examination, Spring- 2023*  
**Course Code: EEE-1221 Course Title: Electronics**

**Total marks: 30 Time: 1.5 hours**

[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. 7 CO2 A
- b) A full-wave rectifier uses two diodes, the internal resistance of each diode may be assumed constant at  $20\ \Omega$ . The transformer r.m.s. secondary voltage from center tap to each end of secondary is  $50\text{ V}$  and load resistance is  $980\ \Omega$ . Find 3 CO2 A
  - (i) Mean load current.
  - (ii) R.m.s. value of load current.
  - (iii) Rectifier efficiency.

2. a) Draw the symbol of an N-P-N transistor and briefly explain it's construction and working principle. 6 CO4 U

**Or**

Draw the three transistor configurations – Common Base, Common Emitter, and Common Collector configurations. For a Common Emitter configuration, establish the relation between  $\alpha$  and  $\beta$  as given by –

$$\beta = \frac{\alpha}{1 - \alpha}$$

- b) For the common base circuit shown in Fig. 2(b), determine  $I_C$  and  $V_{CB}$ . Assume the transistor to be Silicon. 4 CO4 A

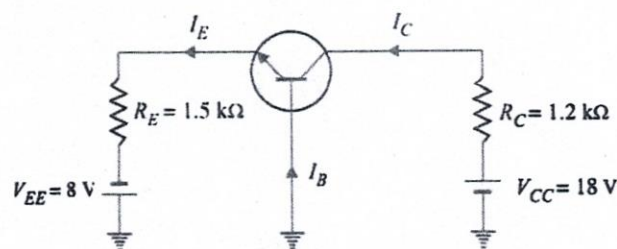


Fig. 2(b)

**Or**

A transistor is connected in Common Emitter configuration in which collector supply is 8 Volts and voltage drop across  $R_C$  connected in the collector circuit is 0.5 Volts. The value of  $R_C = 800\ \Omega$ . If  $\alpha = 0.96$ , determine:

- (i) Collector emitter voltage ( $V_{CE}$ ).
  - (ii) Base current ( $I_B$ ).
3. a) Define clamper. Draw and explain the circuits of (i) positive, and (ii) negative clamper with input and output waveforms. 7 CO3 U

- b) Sketch the output waveform for the circuit shown in Fig. 3(b). It is given that the discharging time constant ( $CR_L$ ) is much greater than the time period of the input wave. 3 CO3 A

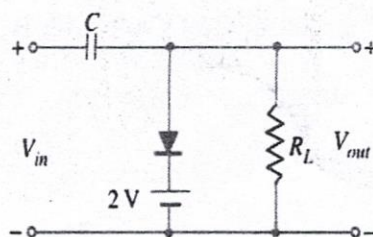
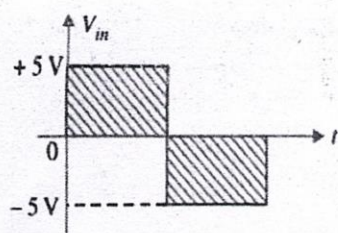


Fig. 3(b)