

Part C

Answer any one full question from each module.

Each full question carries 12 marks.

MODULE I

11. (a) Explain the reverse recovery characteristics of a power diode.
(b) Discuss the significance of dv/dt and di/dt in SCR.

(2 × 6 = 12 marks)

Or

12. Explain in detail the following as applied to an SCR:

- | | |
|-----------------------------|-------------------------|
| (i) average ON current. | (ii) r.m.s. ON current. |
| (iii) surge current rating. | (iv) I^2t rating |
| (v) holding current. | (vi) latching current. |

MODULE II

13. With neat waveforms and circuit diagrams describe the working of a single-phase full wave controlled rectifier connected to R load and derive the relationship between average output voltage and input voltage.

Or

14. Explain the working of a three-phase full converter, connected to a highly inductive load with ripple-free load current, along with the associated waveforms.

MODULE III

15. (a) Explain the working of a step-down chopper with relevant circuit diagram and waveforms.
(b) A step-up chopper having a pulse width of 90 μ S has a d.c. input voltage of 230 V. If the blocking period of the chopper switch is 50 μ S, calculate the average output voltage.

(7 + 5 = 12 marks)

Or

16. (a) Explain the working of cycloconverter with its equivalent circuit. (6 marks)
(b) A step-down chopper is operating from a 220 V d.c. source. The load has $R = 5\Omega$, $E = 22V$ and a very large inductance so that the load current may be assumed to be constant at 22A. If the chopper frequency is 250 Hz, calculate the ON period, OFF period and the duty cycle of the chopper. (6 marks)