

2MPD3 ADVANCED ELECTRIC DRIVES & THEIR CONTROL

Tutorial No. 1

- Q1) What is the maximum d.c. voltage available from a fully controlled bridge converter supplying a motor and operating from low impedance 230 V mains?
- Q2) Estimate the firing angle required to produce a mean output voltage of 300 V from a fully controlled 3-phase converter supplied from 415 V, 50 Hz mains. Assume that the load current is continuous. How would the firing angle have to change if the supply frequency was 60 Hz rather than 50 Hz?
- Q3) Sketch the current waveform in the a.c. supply when a single-phase fully controlled converter with $\alpha = 45^\circ$ is supplying a highly inductive load which draws a smooth current of 25 A. If the a.c. supply is 240 V, 50 Hz, and losses in the devices are neglected, calculate the peak and average supply power per cycle.
- Q4) A 5 kHz step-down transistor chopper operating from a 150 V battery supplies an R/L load which draws an almost-constant current of 5 A. The resistance of the load is 8 Ohms. Treating all devices as ideal, estimate: (a) the mark:space ratio of the chopper; (b) the average power in the load; and (c) the average power from the source.