

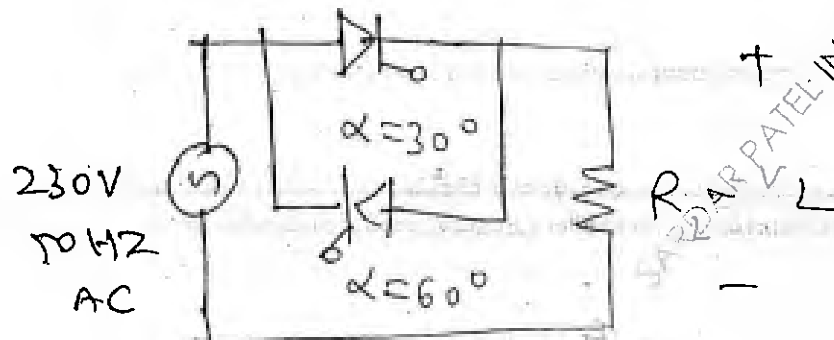
QP Code : 6390

(3 Hours)

[Total Marks : 80

- N. B. : (1) Question No. 1 is compulsory.
 (2) Solve any **three** questions out of remaining five questions.
 (3) **Figures** to the right indicate full marks.

1. (a) Draw and explain gate characteristics of SCR. 5
 (b) Differentiate between symmetrical IGBT and asymmetrical IGBT 5
 (c) Draw output voltage waveform for the circuit given below. Draw 5
 waveform with scale.



- (d) Explain in brief why harmonic neutralisation is necessary in the output of inverter. 5
2. (a) Explain the working of dual converter with all four quadrants of operation. Draw circuit diagram and waveforms. 10
 (b) Draw and explain the working of buck boost converter with the help of circuit diagram and waveforms. Derive the relation for output voltage. 10
3. (a) Explain three phase bridge inverter with 120° conduction mode. Draw circuit diagram and waveforms. 10
 (b) With the help of circuit diagram and waveforms explain bi-directional AC control circuit using TRAC & DIAC. 10
4. (a) Explain semiconverter circuit for the conversion of AC to DC. Draw waveforms for $\alpha = 60^\circ$. Explain how it eliminates the need of freewheeling diode in case of R-L Load to increase the power factor. Explain class D commutation circuit with the help of circuit diagram and waveforms. 10

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5. (a) Explain in detail SOA of MOSFET. 5
(b) Explain multiple pulse width modulation to control the output of inverter with sine wave as a reference signal. 10
(c) What do you understand by cycloconverter. Draw single phase cycloconverter with circuit diagram and waveforms. 5
6. (a) Draw and explain three phase fully controlled bridge rectifier with R load in continuous mode. Derive the relation for output voltage. 10
(b) A single phase semiconverter is operated from 120V 50 HZ ac. supply. The load resistance is 10 ohm. If the average output voltage is 25% of the maximum possible average output voltage. Determine. 10
(i) Firing angle
(ii) RMS and average output current
(iii) RMS and average thyristor current.