

SE SEM-IV ELEC C-scheme may 2026
Date: 19/5/2026.

Duration: 3hrs

[Max Marks: 80]

- Note: 1) Question No. 1 is compulsory
2) Attempt any three questions out of remaining five
3) All Questions carry equal marks
4) Assume suitable data if required and state it clearly

Q1 Attempt any FOUR

[20]

- Explain SOA of MOSFET with appropriate diagrams. [5]
- Compare VSI and CSI. [5]
- Explain need of Heat Sink in PE circuits [5]
- Explain significance of free wheeling diode with example. [5]
- Give applications of DC to DC converter. [5]
- Explain Sin PWM technique. [5]

Q2. a) Differentiate between natural and forced commutation. Explain any two commutation techniques in detail. [10]

b) Draw and explain Two-transistor's analogy of SCR. [10]

Q3. a) Explain 1- ϕ controlled rectifier driving highly inductive load. Draw following waveforms for $\alpha=30^\circ$ 1. Supply voltage, 2. Firing pulses, 3. Load voltage, 4. Load current and 5. Supply current. [10]b) A buck-boost regulator has input voltage 12V. Duty cycle is 0.25 and switching frequency is 25kHz. The inductance L is 150 μ H and C is 220 μ F. The average output current is 1.25A. Find out:- 1. Average output voltage 2. ΔV_c 3. ΔI_L [10]

Q4.a) Draw and explain single phase converter where four quadrant operation is possible. [10]

b) Compare power BJT, MOSFET and IGBT [10]

Q5.a) Draw and explain Buck regulator with waveforms and derive the relation for output voltage. [10]

b) Discuss static and dynamic characteristics of SCR. [10]

Q6. Write short notes on (any two)

[20]

- Protection of SCR.
- Gate-triggering techniques of SCR
- Snubber circuit and its significance
- 3 ϕ Inverter in 120° mode of conduction