

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
FIRST SEMESTER M. TECH DEGREE EXAMINATION

D

Electrical and Electronics Engineering
(Power Systems)

04EE6303—Power Electronic Circuits

Max. Marks : 60

Duration: 3 Hours

PART A

Answer All Questions

Each question carries 3 marks

1. Explain the reverse recovery characteristics of power diodes.
2. Discuss any two thyristor protection scheme.
3. Prove that $\alpha_1 + \alpha_2 = 180^\circ$ for a dual converter.
4. Derive the expression of output voltage of a boost converter.
5. What do you mean by isolated DC to DC converter?
6. Explain the push pull converter topology.
7. What is a multilevel inverter? How are they classified?
8. Compare voltage source inverter and current source inverter.

PART B

Each question carries 6 marks

9. Draw and explain the characteristics of MOSFET.

OR

10. Discuss the characteristics of power transistors.
11. Draw and explain the working of single phase full converter with RLE load for $\alpha > 90^\circ$.

OR

12. A single phase full converter, connected to 230 V, 50 Hz source is feeding a load $R=10 \Omega$ in series with a large inductance that makes the load current ripple free. For a firing angle of 45° , calculate RMS value of load current, output ac power, rectification efficiency and form factor.
13. Discuss the effect of source inductance on a single phase full converter with necessary waveforms and equations.

OR

14. With neat circuit diagram and waveforms explain the operation of single phase full wave ac voltage controller with RL load.
15. Explain buck converter with neat circuit diagram and derive mathematical expression for output voltage.

OR

16. Explain the state space modeling analysis of buck converter.
17. Explain the basic operation of isolated half bridge type converter topologies.

OR

18. Explain the forward converter topology.
19. Discuss various method of voltage control in inverters.

OR

20. With appropriate diagrams, discuss the working of 3 phase full bridge inverter with 180° conduction mode.