Reg. No. : | | | | | | | | | | | |

Question Paper Code: U5506

M.E. DEGREE EXAMINATION, NOV/DEC 2025

Professional Elective

Power Electronics and Drives

21PPE506 - MODERN RECTIFIERS AND RESONANT CONVERTERS

(Regulations 2021)

Duration: Three hours   Maximum: 100 Marks

Answer ALL Questions

PART - A (5 x 20 = 100 Marks)

1. (a) Discuss the operation of a single phase full wave controlled   CO1 U   (20)
         rectifier feeding RL load. What is the effect of a adding a
         freewheeling diode on the performance of the converter?

                                    Or

    (b) Explain the Single phase full wave rectifier-Continuous   CO1 U   (20)
         Conduction Mode with necessary circuit diagram and
         waveforms.

2. (a) Analyze the Properties of Ideal rectifiers.   CO2-Ana   (20)

                                    Or

    (b) Compare the properties of Ideal and Non ideal rectifiers with   CO2-Ana   (20)
         neat diagram.

3. (a) (i) Analyze the operation of zero current switching Quasi-   CO2-Ana   (10)
         resonant boost converter with neat circuit and waveforms.

         (ii) Compare ZVS and ZCS topologies.   CO2-Ana   (10)

                                    Or

    (b) Analyze the operation of quasi resonant ZVS Boost converter   CO3-Ana   (20)
         and deduce the expression for dc gain.

4. (a) Describe in detail about state space averaged model for an   CO4-U   (20)
         ideal buck converter.

                                    Or

(b) Write short notes on CO4-U (20)
      (i) Review of linear system analysis
      (ii) State space averaging

5. (a) Define Pulse Width Modulation? Explain in detail about CO5- App (20)
voltage mode PWM scheme with necessary diagram.

<div align="center">Or</div>

(b) Describe in detail about design of variable structure controller CO5-App (20)
for the source current shaping of PWM rectifiers.

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