

Reg. No. :

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Question Paper Code: U5502

M.E. DEGREE EXAMINATION, DEC 2025

Power Electronics and Drives

21PPE502– ELECTRIC POWER QUALITY

(Regulations 2021)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART - A (5 x 20 = 100 Marks)

1. (a) Explain how harmonics can affect the performance of electrical equipment. CO1-U (20)

Or

- (b) Classify and explain short-duration variations, long-duration variations and Power System Frequency Variations. CO1-U (20)

2. (a) Apply the concepts of real and reactive power to analyze how they maintain stability and efficiency in an electrical power system. CO2-App (20)

Or

- (b) Utilize circuit-level modeling to construct a simplified circuit diagram for a DC rectifier-supported DVR and explain the functions of its components. CO2-App (20)

3. (a) Compare and contrast the advantages and disadvantages of Rectifier Supported DVR and DC Capacitor Supported DVR. CO3-Ana (20)

Or

- (b) Examine how the symmetrical components theory can be utilized to analyze unbalanced conditions in a three-phase power system. CO3-Ana (20)

4. (a) Compare DVR technology with traditional voltage regulation methods to analyze its effectiveness in mitigating voltage disturbances. CO4-Ana (20)

Or

- (b) Analyze the effectiveness of generating reference currents for compensating single-phase loads when the source is unbalanced. CO4-Ana (20)

5. (a) Apply PSCAD/EMTDC to model a series active filter and examine its behavior in mitigating harmonic distortions in a power system. CO5-App (20)

Or

- (b) Apply STATCOM control principles to construct a control strategy for operating a STATCOM in voltage control mode to compensate single-phase loads. CO5-App (20)