

Reg. No. :

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**Question Paper Code:U5402**

M.E. DEGREE EXAMINATION, NOV/DEC 2024

First Semester

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) Explain the power quality terms and standards in detail. CO1-U (20)
2. (a) How would you apply a DVR (Dynamic Voltage Restorer) to mitigate voltage sags in a commercial building? CO2-App (20)  
Or  
(b) How would generate reference currents using instantaneous PQ theory for compensating single-phase loads in a three-phase system? CO2-App (20)
3. (a) Examine how the symmetrical components theory can be utilized to analyze unbalanced conditions in a three-phase power system CO3-Ana (20)  
Or  
(b) Analyze the potential interaction effects between multiple DG units on a distribution network. CO3-Ana (20)
4. (a) Examine the effectiveness of using active power filters versus passive filters for harmonic reduction in an industrial setting. CO3-Ana (20)  
Or  
(b) Analyze the impact of islanding on the safety and reliability of the power grid. CO3-Ana (20)

5. (a) Design a simulation model to demonstrate the impact of shunt compensation on various parameters of a power system under different scenarios. CO5-C (20)

Or

(b) Design an innovative closed-loop load balancing system that incorporates advanced sensor technologies and real-time control algorithms to optimize power distribution in a smart grid environment. CO5-C (20)