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Question Paper Code: BPE210



INSTITUTE OF AERONAUTICAL ENGINEERING
(Autonomous)

M.Tech II Semester End Examinations (Supplementary) - January, 2018

Regulation: IARE-R16

POWER QUALITY
(Power Electronics and Electrical Drives)

Time: 3 Hours

Max Marks: 70

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

UNIT – I

1. (a) Explain the impacts of power quality problems on end users? [7M]
(b) List out the power acceptability curves? Explain the CBEMA curve with neat figure? [7M]
2. (a) Define the following power quality problems: [7M]
 - i. Short duration voltage variation
 - ii. Total Harmonic Distortion and write the expression of Voltage THD
- (b) Describe the major power quality problems concerned by the customers and utility? [7M]

UNIT – II

3. (a) Explain the following commercial non-linear loads [7M]
 - i. Single-Phase power supplies
 - ii. Fluorescent lighting
- (b) Explain current fed type of non-linear loads? [7M]
4. (a) Define and classify the non-linear loads? [7M]
(b) Explain the solid-state devices type non-linear loads? [7M]

UNIT – III

5. (a) Differentiate between true and displacement power factor? [7M]
(b) Explain any three types of power quality measuring instruments? [7M]
6. (a) Describe the discrete Fourier transform technique? [7M]
(b) Explain the wavelet transform technique for error analysis in power quality? [7M]

UNIT – IV

7. (a) Explain the instantaneous active and reactive powers in a three phase power systems? [7M]
(b) Derive the relation between Total Harmonic Distortion and Distortion Index? [7M]
8. (a) Define the following indices for the voltage sag analysis: [7M]
i. Detroit Edison Sag Score
ii. Voltage Sag Energy
(b) Explain the conventional approaches to reduce harmonic reduction and IEEE 519: voltage distortion limits? [7M]

UNIT – V

9. (a) What is meant by Custom Power Device? Explain about Utility Customer Interface? [7M]
(b) Explain the operation of a Unified Power Quality Conditioner with neat schematic diagram? [7M]
10. (a) With a neat schematic diagram, Explain how a load will be compensated in a distribution system using ideal shunt compensator (DSTATCOM)? [7M]
(b) Explain the concept of custom power park with block diagram? [7M]

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