

Code No: **G4305/R13**

**M. Tech. I Semester Supplementary Examinations, January-2017**

**POWER QUALITY**

**(Common to PE, P&ID, PE&ED, PE&D, EM&D and PE&PS)**

**Time: 3 hours**

**Max. Marks: 60**

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*Answer any FIVE Questions*  
*All Questions Carry Equal Marks*

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1. a What is the impact of transient on power quality? Classify the transients that occur in power systems. 6  
 b Explain the short-duration voltage variations. Compare short-duration voltage variations with long-duration voltage variations. 6
2. a Explain the following in detail: 6  
 a) Voltage Unbalance  
 b) Waveform Distortion  
 c) Voltage fluctuation  
 b Define voltage sag and voltage interruption. What is their impact on equipments connected? Discuss the sources of sags and interruptions. 6
3. Discuss the following source of transient over voltages: 4x3  
 a) Capacitor switching  
 b) Magnification of capacitor-switching transients  
 c) Lightning  
 d) Ferro resonance.
4. a Describe how utilities can deal with problems related to capacitor-switching transients. 6  
 b Discuss briefly about 6  
 i. Utility System Lightning Protection  
 ii. Load Switching Transient Problems.
5. a Explain about the controlling of harmonics using passive and active filters. How active filters overcome the drawbacks of passive filters in controlling of harmonics. 6  
 b Explain briefly about the phenomena of current distortion and the voltage distortion under the presence of harmonics. 6
6. a Explain the following: 7  
 i. Harmonic sources from commercial loads  
 ii. Harmonic sources from industrial loads.  
 b Explain the significance of harmonic index. Explain the general harmonic indices used universally in analyzing harmonic distortion. 5

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7. a What is meant by voltage flicker. List some sources of flicker. Discuss the methods for mitigation of flicker. 6
- b Discuss how the capacitors are used for voltage regulation in power systems in shunt and series configuration. 6
8. a Discuss main power quality issues which affect distributed generation. 6
- b Explain the solutions to wiring and grounding problems due to interconnection of DG to improve power quality. 6

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