

Code No: I4305/R16

M. Tech. I Semester Regular Examinations, January-2017

**POWER QUALITY**

[Common to Power Electronic (43), PI&D(42), PE & ED(54), PE & D (52), PE & S(12), EM & D(44) and Power Electronics & Power Systems (99)]

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 about short-duration voltage variations. Compare short-duration voltage variations and long-duration voltage variations.   | 6   |
| 2.   | Explain the following in detail:<br>a) Voltage Unbalance<br>b) Waveform Distortion<br>c) Voltage fluctuation   | 6   |
| 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:<br>a) Capacitor switching<br>b) Magnification of capacitor-switching transients<br>c) Lightning<br>d) Ferro resonance | 4x3 |
| 4. a | Describe how utilities can deal with problems related to capacitor-switching transients.   | 6   |
| b    | Discuss briefly about<br>i. Utility System Lightning Protection<br>ii. Load Switching Transient Problems   | 6   |
| 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:<br>i. Harmonic sources from commercial loads<br>ii. Harmonic sources from industrial loads.   | 7   |
| 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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