Seat No.: _____ Enrolment No._____

# GUJARAT TECHNOLOGICAL UNIVERSITY

**M. E. - SEMESTER – III • EXAMINATION – SUMMER • 2014**

**Subject code: 730701** **Date: 03-06-2014**

**Subject Name: Power Quality Management**

**Time: 02:30 pm - 05:00 pm** **Total Marks: 70**

## Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

| | | | |
|---|---|---|---|
| **Q.1** | **(a)** | What do you mean by term ñpower qualityò? Discuss all the power quality issues in brief. | **07** |
| | **(b)** | What do you mean by (i) Power quality and Weak link and (ii) Treatment Criteria? Discuss the above terms with suitable examples with respect to power quality. | **07** |
| **Q.2** | **(a)** | Explain the term ñpower frequency disturbancesò in detail with suitable examples. | **07** |
| | **(b)** | Explain the classification of equipment sensitivity to voltage sag events. | **07** |
| | | **OR** | |
| | **(b)** | What are CBEMA and ITIC graphs? Draw and discuss the ITIC graph in detail. | **07** |
| **Q.3** | **(a)** | What is a transient? Discuss the causes of transients in power system. | **07** |
| | **(b)** | Discuss the basic principles of wiring. As per EPRI and others discuss how the improper grounding and wiring cause the power quality problems. | **07** |
| | | **OR** | |
| **Q.3** | **(a)** | Define, displacement power factor and true power factor? Mention the advantages of power factor correction. Explain various methods of power factor improvement and discuss the methods with respect to power quality point of view. | **07** |
| | **(b)** | Define the terms ñGroundingò. If improper grounding is found in commercial building what will be the effect on sensitive equipments. Give your suggestions to solve this power quality problem. | **07** |
| **Q.4** | **(a)** | Discuss the effect of harmonics on a transformers and induction motors. | **07** |
| | **(b)** | Prove that loss increase is proportional to current even under distorted conditions and that the total dissipated power on the resistor increases proportionally to the square of current. (Assume that a 1-ohm resistive element is the path for a fundamental current, I=1A, containing additional third, fifth, and seventh harmonic levels whose amplitudes are inversely proportional to their harmonic order).Also find the $THD_I$ for the same case. | **07** |
| | | **OR** | |
| **Q.4** | **(a)** | Discuss various examples of sources of harmonic with suitable waveform and harmonic spectrum. | **07** |
| **Q.4** | **(b)** | Discuss the series and parallel resonance with respect to harmonics study. | **07** |
| **Q.5** | **(a)** | How harmonics are cancellation through use of multi-pulse converters? Explain with suitable diagrams and waveforms. | **07** |
| | **(b)** | Describe the objectives and procedures for performing power quality monitoring. | **07** |
| | | **OR** | |
| **Q.5** | **(a)** | Whoôs Involved in the Power Quality Industry? Discuss in detail. Also discuss the present status of Power Quality Standards in India. | **07** |
| | **(b)** | What do you mean by distributed generation? Discuss the distributed generation technologies in brief. Also discuss the power quality issues affected by distributed generation in brief. | **07** |

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