Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – III • EXAMINATION – WINTER 2012

Subject code: 730701 **Date: 30/12/2012**

Subject Name: Power Quality Management

Time: 10.30 am – 01.00 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 understand about power quality issues? Discuss all the powerquality issues in brief. **7**

(b) Define and describe following terms: **7**
(1)Linear loads (2)Inrush current (3)Voltage swell (4) Voltage sag

Q.2 **(a)** Explain the effects of Harmonics on AC Motors performance. **7**

(b) Explain in brief various loads which are responsible for introduction of harmonics in the system. **7**

OR

(b) Define, displacement power factor and true power factor .List the methods of power factor improvement techniques and explain the static VAR Compensator also state the advantages of power factor corrections. **7**

Q.3 **(a)** Explain various EMI mitigation techniques in brief. **7**

(b) State and explain briefly the harmonic current mitigation techniques. **7**

OR

Q.3 **(a)** What is distributed generation? Elaborate its effect on the power quality issues. Explain methods of distributed generation. **7**

(b) With a case study explain the fatal effect which may result due to loss of Grounding. **7**

Q.4 **(a)** Discuss “switching of loads” and “interruption of fault currents” as causes of Transients. **7**

(b) How neutral conductor is selected for the site where many computers are used? Discuss the possible solution of neutral conductor overloading. **7**

OR

Q.4 **(a)** List various power quality measuring devices and discuss the main features of power quality analyzer?Explain instrument setupprocedure to measure power quality events **7**

(b) Discuss the harmonic sources like SMPS, Fluorescent lighting and adjustablespeed drives with suitable waveform and harmonic spectrum. **7**

Q.5 **(a)** Enlist a power quality related standards supplied from various organizations. **7**

(b) Discuss the effect of harmonics on a transformer. What is k rating of atransformer? **7**
A transformer with a full load current rating of 1000 A is subjected to a load with the following nonlinear characteristics. The transformer has a rated winding eddy current loss density of 10.0% (0.10 pu). Find the transformer derating factor.

Harmonic number (h)	fh (pu)
1	1
3	0.35
5	0.17
7	0.09

OR

Q.5 **(a)** What is the importance of the value of earth’s resistance? Describe the fall of potential methods for measurement of earth’s resistance. **7**

(b) Explain the following with suitable diagrams **7**
(i) Off line UPS (ii) On line UPS (iii) Rotary UPS units.

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