

Seat No.: \_\_\_\_\_

Enrolment No. \_\_\_\_\_

## **GUJARAT TECHNOLOGICAL UNIVERSITY**

**M.E. SEMESTER III–EXAMINATION – WINTER 2015**

**Subject code: 2730707**

**Date: 04/12/2015**

**Subject Name: Power quality issues and their mitigation techniques in power systems**

**Time: 2:30 PM to 5:00 PM**

**Total Marks: 70**

### **Instructions:**

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

Q1 (a) What do you understand about power quality issues? Discuss all the power quality issues in brief. **07**

(b) Define and technically describe following terms with suitable example: **07**

- (1) Non Linear loads
- (2) Inrush current
- (3) Power factor (displacement)
- (4) Voltage sag
- (5) Transient

Q2 (a) Discuss the Harmonic phase rotation and phase angle relationship. **07**

(b) Discuss the Harmonic issues for phase controlled thyristors. **07**

**OR**

(b) Explain causes of voltage and current harmonics. **07**

Q 3 (a) Discuss the effect of harmonics on AC Motors Drive. **07**

(b) Discuss the effect of harmonics on furnace loads & thyristor controlled reactor . **07**

**OR**

Q 3 (a) Discuss significance of power factor correction with power quality point of view. **07**

(b) What are the power quality standards? Discuss responsibilities of supplier and user of electrical power with respect to power quality. **07**

Q 4 (a) Explain different challenges against distributed generation. **07**

(b) Explain the operation & control of schemes D-SVC. **07**

**OR**

Q 4 (a) What is distributed generation? Explain the effect on the power quality issues. Briefly explain methods of distributed generation. **07**

(b) Explain the operation & control of schemes D-STATCOM. **07**

Q 5 (a) Discuss various aspects to be considered in the design of passive filters. **07**

(b) Explain working of shunt active filter for constant power compensation. Draw the block diagram for constant instantaneous power control strategy and explain its working. **07**

**OR**

Q 5 (a) Explain the sinusoidal current control strategy for three phase Three Wire Shunt Active Filter with necessary Block Diagram. **07**

(b) Compare Active filter with Passive filters. **07**

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