

GUJARAT TECHNOLOGICAL UNIVERSITY**M. E. Sem – IV Examination May 2011****Subject code: 740701****Subject Name: Harmonic Measurements and Filtration Techniques****Date: 16/05/2011****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) Distinguish between linear and non-linear load. Give their examples. **07**
(b) Explain the terms: Displacement, Distortion and Total power factor. Give relation between them. **07**

- Q.2** (a) Discuss the types of Harmonics generated in 6-pulse power converters. Also discuss the conditions, which are responsible to generate non-characteristics harmonics in power converters. **07**
(b) Discuss harmonic distortion limits for voltage and currents in conformance with IEC limits. **07**

OR

- (b) In which conditions, harmonics are responsible for neutral conductor over loading? Justify your answer by giving example. **07**

- Q.3** (a) How harmonics affects the performance of rotating machines. **07**
(b) Explain how increase of short circuit ratio helps to reduce harmonics in power systems **07**

OR

- Q.3** (a) Explain how Network reconfigurations help to reduce harmonics in power systems. **07**
(b) Why it is necessary to measure waveform distortions and also state how to carry out its measurements. **07**

- Q.4** (a) 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**
(b) Write a short notes on Dynamic response of shunt active filter. **07**

OR

- Q.4** (a) Giving circuit diagram, explain the working of series active filters. Also discuss the algorithm used to generate compensated voltage signals. **07**
Giving schematic diagram, explain the working of positive sequence voltage detector circuit. Also explain functional block diagram of PLL circuit. Why positive sequence voltage detector circuit is so important in shunt active filter design? **07**

- Q.5** (a) Explain working and design aspects of single tuned passive filters. Also discuss its quality factor. **07**
(b) Discuss various aspects to be considered in the design of passive filters. **07**

OR

- Q.5** (a) Write short note on Second generation control circuit for series active filter **07**
(b) Do comparison between Hybrid and pure active filters. **07**
