

GUJARAT TECHNOLOGICAL UNIVERSITY**ME - SEMESTER-IV • EXAMINATION- WINTER • 2014****Subject Code: 740701****Date: 26-11-2014****Subject Name: Harmonic Measurement and Filtration Techniques****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) Compare generalize Fryze current control strategy with p-q based control strategy used for shunt active filter. **07**
- (b) Explain following terms: **07**
- a. Instantaneous real and reactive average power
 - b. Instantaneous real and reactive oscillating power
- Q.2** (a) Discuss general description of shunt active filter with shunt current compensation principle. **07**
- (b) Explain power quality indices under harmonic distortion and their significance in brief. **07**
- OR**
- (b) Discuss harmonic sources and their effect on power quality. **07**
- Q.3** (a) Discuss effect of harmonics on transformers and rotating machines. **07**
- (b) Why harmonic measurement is required? In brief mention steps required in harmonic measurement procedure. **07**
- OR**
- Q.3** (a) Discuss effect of harmonics on lighting devices and relays. **07**
- (b) Discuss design of single tuned filter with necessary equations. Also explain significance of parallel resonance on the design. **07**
- Q.4** (a) What is hybrid filter? How series filter acts as active impedance in hybrid filter? **07**
- (b) Compare hybrid filters with pure active filters. Give applications of hybrid filter. **07**
- OR**
- Q.4** (a) Explain compensation principle of hybrid filter with necessary equations. **07**
- Q.4** (b) What is UPFC? Explain voltage regulation principle realized by shunt converter of the UPFC with phasor diagrams **07**
- Q.5** (a) Discuss aim of harmonic flow studies. Draw Z-f plot for series and parallel resonance. **07**
- (b) Discuss basic concept of UPQC. What is difference between UPFC and UPQC? **07**
- OR**
- Q.5** (a) Discuss propagation of harmonic currents to distribution system. Explain transformer model for harmonic analysis. **07**
- (b) Discuss harmonic cancellation using multipulse converters. **07**
