

GUJARAT TECHNOLOGICAL UNIVERSITY**ME - SEMESTER-IV • EXAMINATION – SUMMER • 2014****Subject Code: 742901****Date: 04-06-2014****Subject Name: Harmonics and Filtration Methods****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.
4. Notations used have usual meaning.

- Q.1** (a) Explain generation of harmonics with suitable example. Also discuss about representation of harmonics source. **07**
- (b) Write a brief note on methods for the detection of voltage events. **07**
- Q.2** (a) Define and explain following terms, **07**
- (i) K factor
- (ii) Distortion Factor
- (iii) Displacement Power Factor
- (b) Obtain Total Harmonics Distortion (THD) in percentage for square waveform. **07**
- OR**
- (b) A single phase half wave controlled rectifier is supplying power to resistive load. If firing angle is α , find the input current harmonics. **07**
- Q.3** (a) Explain passive tuned harmonics filter for reduction of harmonics. **07**
- (b) Write a brief note on harmonic propagation facts. **07**
- OR**
- Q.3** (a) Explain Voltage-Quality Factor & Power-Quality Factor for electrical network. **07**
- (b) Discuss harmonics distortion limit for voltage and current in conformance with IEC limits. **07**
- Q.4** (a) Describe the basic configuration of UPQC with necessary block diagram. **07**
- (b) Write short note on power quality standard. **07**
- OR**
- Q.4** (a) Explain discuss hybrid active power filter circuit with merits and demerits. **07**
- (b) Discuss interrelation between AC system and load parameters. **07**
- Q.5** (a) Discuss the effect of harmonics on followings, **07**
- (i) Rotating electrical machines.
- (ii) Cables for power supply system
- (b) Write brief note on voltage events and its adverse effects. **07**
- OR**
- Q.5** (a) Describe basic configuration of series active filter with necessary block diagram. **07**
- (b) Explain the sinusoidal current control strategy for three phase Three Wire Shunt Active Filter with necessary Block Diagram. **07**
