

GUJARAT TECHNOLOGICAL UNIVERSITY**ME - SEMESTER-IV • EXAMINATION – SUMMER 2013****Subject Code: 740701****Date: 14-05-2013****Subject Name: Harmonics Measurements and Filtration Techniques****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) Discuss effects of harmonics on rotating machines and on capacitors. **07**

Q.2 (a) In which conditions, harmonics are responsible for neutral conductor over loading? Justify your answer by giving example. **07**

(b) Justify harmonics and power factor are closely related to each other. **07**

OR

(b) Define following terms: **07**

1. Total Harmonic Distortion (THD)
2. Total Demand Distortion (TDD)
3. Telephone influence factor (TIF)

Q.3 (a) Explain working and design aspects of Band pass passive filters. Also discuss its quality factor. **07**

(b) How does harmonic content reduce in synchronous machine by using distributed winding. **07**

OR

Q.3 (a) Why rotor of 3-phase induction motor is run at $1/7$ th times normal synchronous speed due to presence of 7th order harmonic. **07**

(b) Why it is necessary to measure waveform distortions and also state how to carryouts its measurements. **07**

Q.4 (a) Compare Active filter with Passive filters. **07**

(b) Write a short note on Dynamic response of shunt active filter. **07**

OR

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

Q.5 (a) Give comparison between Hybrid and pure active filters. **07**

(b) Give definition of harmonics and classify them according to their rotating phase-sequences. **07**

OR

Q.5 (a) Giving block diagram and control algorithm, explain how shunt active filters are used for sinusoidal current control. **07**

(b) Write short note on Second-generation control circuit for series active filter. **07**
