

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VIII • EXAMINATION – SUMMER 2013****Subject Code: 182405****Date: 09/05/2013****Subject Name: Digital Control of Power Processing Circuits****Time: 10:30 am TO 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)** Elaborate the importance of Digital Control in modern Power Electronics indicating its advantages over analog control. **07**
- (b)** Explain Space Vector Modulation technique to implement PWM in 3- Φ switching converters giving its advantages. **07**
- Q.2 (a)** Describe the implementation of digital control in a 1- Φ UPS with a neat block diagram. **07**
- (b)** Explain the working principle of operation of half bridge VSI with a proper schematic diagram and waveforms. **07**
- OR**
- (b)** Discuss the effects of switching dead times and suggest remedies for it. **07**
- Q.3 (a)** Discuss analog PI current controller with appropriate block diagram. **07**
- (b)** Write a note on Parks transformation. **07**
- OR**
- Q.3 (a)** Explain the non-linear current control technique. **07**
- (b)** Describe $\alpha\beta$ transformation with necessary equations. **07**
- Q.4 (a)** Explain the typical organization of a digital current controller. **07**
- (b)** Draw and explain dead beat current control loop and derive necessary equations. **07**
- OR**
- Q.4 (a)** Discuss aliasing and its effects on signals. **07**
- Q.4 (b)** Explain Quantization and Arithmetic noise. **07**
- Q.5 (a)** Explain repetitive based voltage controller. **07**
- (b)** Draw and explain the typical organization of Active Power Filter. **07**
- OR**
- Q.5 (a)** Explain DFT based voltage controller. **07**
- (b)** Draw only, the 3- Φ inverter output voltage vectors and their projections on π plane. **07**
