

GUJARAT TECHNOLOGICAL UNIVERSITY**B E Sem-VI Examination May 2011****Subject code: 162405****Subject Name: Power Processing Circuit - I****Date: 23/05/2011****Time: 10.30 am To 1.00 pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. English version is Authentic

- Q.1** (a) Explain the working of single-phase Full-wave bridge rectifier with resistive load. Also explain various performance factors of the uncontrolled rectifier. **07**
- (b) Explain single-phase Half-wave controlled rectifier with R-L load with the help of neat circuit diagram and waveforms. **07**

Q.2

- (a) Explain single-phase full bridge converter with R-L-E load. Draw the waveforms of voltage and current for continuous load current for $\alpha < 90^\circ$. **07**
- (b) Explain single-phase Full-wave bridge rectifier with R-L load for continuous load current. **07**

OR

- (b) Explain three-phase full converter with R-L-E load with neat circuit diagram. Draw the waveforms of output voltage for $\alpha = 0^\circ$ and $\alpha = 60^\circ$. **07**

Q.3

- (a) Draw the schematic block diagram of Linear Power Supply and Switch Mode DC Power Supply. Explain the function of each block in brief. **07**
- (b) Explain voltage commutated chopper with neat circuit diagram and waveforms. **07**

OR

- Q.3** (a) Explain Jone's chopper with circuit diagram and waveforms. **07**
- (b) Explain Frequency Modulation and Pulse Width Modulation control methods used in DC-DC converters. **07**

- Q.4** (a) Explain CUK converter with neat circuit diagram and waveforms. **07**
- (b) Obtain the transfer function $\bar{v}_0(s)/\bar{d}(s)$ in a forward converter operating in a continuous conduction mode. Assume $N_1/N_2 = 1$ for simplicity. **07**

OR

- Q.4** (a) Explain push-pull converter with circuit diagram, waveforms and expressions. **07**
- (b) In a buck-boost converter operating at 20 kHz, L is equal to 0.05 mH. The output capacitor C is sufficiently large and $V_d = 15$ V. The output is to be regulated at 10 V and the converter is supplying a load of 10 W. Calculate the duty ratio D. **07**

- Q.5** (a) Explain Voltage Feed Forward PWM control and Current-Mode control with the help of necessary diagrams. **07**
- (b) Explain Zero-Voltage-Switching, Clamped voltage DC-DC converter. **07**

OR

- Q.5** (a) Explain ZCS resonant switch DC-DC converter. **07**
- (b) Explain the LUO converter with necessary diagrams. **07**
