Seat No.: _____ Enrolment No._____

# GUJARAT TECHNOLOGICAL UNIVERSITY

**BE – SEMESTER – VI (OLD).EXAMINATION – WINTER 2016**

**Subject Code: 162405** **Date: 24/10/2016**

**Subject Name: Power Processing Circuits - I**

**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.**

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|---|---|---|---|
| **Q.1** | **(a)** | Describe ZVS resonant converts with relevant circuit & waveforms. | **07** |
| | **(b)** | A single phase full converter bridge is connected to RLE load. The $V_s$= 230V, 50 Hz. The $I_{O(AVG)}$= of 10A is constant. For R=0.4Ω & L=2mH, compute (1) Firing angle for E = 120V (2) Firing angle for E =-120V | **07** |
| **Q.2** | **(a)** | Explain working of Morgan's chopper with circuit diagram & waveforms. | **07** |
| | **(b)** | Draw basic block diagram of switch mode power supply. Discuss full-bridge topology of DC-DC converter with necessary diagrams. | **07** |
| | | **OR** | |
| | **(b)** | Explain Push-pull converter type DC-DC isolated converter with necessary diagram & waveforms. Derive equation for O/P voltage. | **07** |
| **Q.3** | **(a)** | Define following terms with respect to DC power supply. 1. Supply Voltage 2. Noise 3. Regulation 4. Supply Current 5. Efficiency 6. Physical dimensions 7. Load voltage | **07** |
| | **(b)** | Explain 3-Phase, 3-Pulse uncontrolled rectifier with circuit diagram & waveforms. Consider load is Resistive. | **07** |
| | | **OR** | |
| **Q.3** | **(a)** | Give comparison between Linear Regulated Power Supply & Switch Mode Power Supply. | **07** |
| | **(b)** | Explain 3-Phase, 6-Pulse uncontrolled rectifier with circuit diagram & waveforms. Consider load is RL type. | **07** |
| **Q.4** | **(a)** | A boost regulator has following parameters: $V_{in}$ = 5V, $V_o$ = 15V, $I_o$=0.5A & Switching Frequency = 25KHz. If L=150uH & C=220uF, Determine (1) Duty Cycle (2) Ripple Current of & Peak current of L (3) Critical values of L & C. | **07** |
| | **(b)** | Discuss various control strategy used in DC-DC converter (Chopper). | **07** |
| | | **OR** | |
| **Q.4** | **(a)** | Discuss Single Ended Primary Inductor Converter with necessary circuit diagram & waveforms. | **07** |
| | **(b)** | Explain operation of four quadrant chopper with necessary operational diagram. | **07** |
| **Q.5** | **(a)** | Describe operation of 1-phase semi-converter circuit diagram with RL load in continuous & discontinuous mode. | **07** |
| | **(b)** | Discuss working of Forward converter (DC-DC). Also discuss benefits of tertiary windings. | **07** |
| | | **OR** | |
| **Q.5** | **(a)** | Explain effect of source inductance in 1-phase full controlled converter. Draw necessary diagrams & waveforms in support to your answer. | **07** |
| | **(b)** | Write a short note on Luo converter. | **07** |

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