

GUJARAT TECHNOLOGICAL UNIVERSITY
M. E. - SEMESTER – I • EXAMINATION – WINTER • 2014

Subject code: 712902N**Date: 02-12-2014****Subject Name: Power Processing Circuits****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) Explain operation of dual converter with circulating current. **07**
(b) Explain single phase to single phase cycloconverter with discontinuous current operation. **07**
- Q.2** (a) What are the types of commutation circuits? Explain auxiliary commutation method in detail. **07**
(b) Explain power MOSFET in detail. **07**
- OR**
- (b) Describe the construction and working of GTO. **07**
- Q.3** (a) A single phase fully controlled bridge is operated with a resistive load $R=10\Omega$, the input voltage to the bridge is 230V. The firing angle is 60° . Determine, **07**
1.) Average load voltage, 2.) Average output power,
3.) Average and RMS load current, 4.) Rectifier efficiency,
5.) Form factor and ripple factor, 6.) SCR ratings.
(b) Explain 3- ϕ inverter circuit with 120° conduction mode. **07**
- OR**
- Q.3** (a) Explain 1- ϕ bridge half controlled converter with R-L load. **07**
(b) The full bridge inverter has a source voltage $E_{dc}=220V$. The inverter supplies an RLC load with $R=10\Omega$, $L=10mH$ and $C=52\mu F$. The inverter frequency is 400Hz. Determine, **07**
1.) the RMS load current at fundamental frequency
2.) RMS value of load current, 3.) The power output
4.) The average supply current.
- Q.4** (a) Explain working principle of buck converter. Discuss the operation and derive the mathematical relations. **07**
(b) Explain the effect of source inductance on controlled converter operation. **07**
- OR**
- Q.4** (a) Explain single pulse width modulation technique for inverter circuit. **07**
Q.4 (b) Write note on cuk converter. **07**
- Q.5** (a) Write note on 3-phase 6-pulse controlled rectifier. **07**
(b) Write note on class-C commutation. **07**
- OR**
- Q.5** (a) Write note on 3-phase A.C. voltage controller with R-load. **07**
(b) Explain various triggering circuits for SCR. **07**
