Reg.No. \_\_\_\_\_\_\_\_\_\_\_\_



**UNIVERSITY**

(Karunya Institute of Technology & Sciences)

(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

**End Semester Examination – Nov/Dec – 2016**

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|  |  | **Semester :** | **2016-17 ODD** |
| **Code :** | **14EE2010** | **Duration :** | **3hrs** |
| **Sub. Name :** | **P0wer Electronics** | **Max. marks :** | **100** |

**ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)**

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| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. | a. | Draw and elucidate the reverse recovery characteristics of a power diode. | CO1 | **10** |
| b. | Compare Power MOSFET and Power BJT. | CO1 | **5** |
|  | c. | Outline the V-I Characteristics of TRIAC with a neat diagram. | CO1 | **5** |
| **(OR)** | | | | |
| 2. | a. | Explain the Static and switching characteristics of Thyristor. | CO1 | **15** |
| b. | What is meant by commutation? Also mention its types. | CO1 | **5** |
| 3. | a. | Sketch the circuit diagram of single phase dual converter and explain its working. | CO2 | **6** |
|  | b. | A single phase fully controlled full bridge converter is supplied by 230V, 50Hz. It is connected with R-L Load.  i) Determine the average and rms output voltage if the firing angle is 45°.  ii) Calculate the firing angle for which the average output voltage of the converter is 100V. | CO2 | **14** |
| **(OR)** | | | | |
| 4. | a. | Compare single phase full and semi controlled converters. | CO3 | **5** |
|  | b. | Explain the operation of a single phase half controlled converter bridge for resitive load with neat diagram and waveforms. | CO2 | **15** |
| 5. | a. | Analyze the working of single phase to single phase step down cyclo-converter with circuit diagram and waveforms. Also obtain the expression for rms output voltage. | CO2 | **20** |
| **(OR)** | | | | |
| 6. | a. | Recommend a DC to DC Converter which can operate in all the four quadrants. | CO2 | **15** |
|  | b. | A type – A chopper has Vdc = 200 V, R = 10 Ohms. If the duty cycle is 0.54, calculate average voltage Vavg, rms voltage Vrms, average current Iavg and output power Po | CO2 | **5** |
| 7. | a. | Describe the operation of three phase inverter in 120° mode conduction with necessary circuit diagram, waveforms. Derive the expression for the RMS value of phase voltage and line voltage. | CO2 | **20** |
| **(OR)** | | | | |
| 8. | a. | What is PWM? Also mention its advantages and disadvantages. | CO3 | **5** |
|  | b. | Explain about the working of single phase full bridge inverter with relevant circuit diagram and waveforms. Also obtain the expression for the rms output voltage. | CO2 | **15** |
|  | | **Compulsory:** |  |  |
| 9. | a. | Discuss the working of UPS with neat circuit diagram. | CO3 | **10** |
|  | b | With a neat circuit diagram, explain any one type of firing circuit used for Thyristor. | CO2 | **10** |

ALL THE BEST

Course Outcomes:

The student will be able to

CO1: Know the usage of electronics and solid-state power devices for the control, conversion, and protection of electrical energy.

CO2: Design power electronics circuits based on criteria (power, efficiency, ripple voltage and current, harmonic distortions, power factor).

CO3: Select components; interpret terminal characteristics of the components for designing the circuitry for power converters.