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 :** | **14EE3003** | **Duration :** | **3hrs** |
| **Sub. Name :** | **POWER CONVERTER ANALYSIS II** | **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. | With the help of waveform and necessary equations, explain the principle of operation of single phase HALF bridge inverter which is used to drive the single phase Induction Motor. | CO1 | **15** |
| b. | Demonstrate the various performance parameters used to justify the quality of an inverter. | CO1 | **5** |
| **(OR)** | | | | |
| 2. | a. | With neat circuit diagrams and waveforms explain the operation of 180° mode operation of three phase inverter in detail. | CO1 | **15** |
| b. | The Single Phase FULL Bridge Inverter has a resistive load of 2.4Ω, and the dc input voltage is Vs = 48V, Determine the Total Harmonic Distortion. | CO2 | **5** |
| 3. | a. | Explain the single and multiple pulse width modulation techniques used for Power Electronic system to control the output voltage. | CO2 | **15** |
|  | b. | Describe that how the power devices are underutilized in 120° mode of operation. | CO1 | **5** |
| **(OR)** | | | | |
| 4. |  | Analyze the various modes of operation of a single phase auto – sequential  Commutated inverter with neat diagrams and waveforms which is suitable  for industrial applications. | CO2 | **20** |
| 5. | a. | Explain about single phase capacitor – commutated current source inverter which is used for the speed control of an Induction motor. | CO1 | **15** |
|  | b. | Distinguish between voltage source inverter and current source inverter. | CO1 | **5** |
| **(OR)** | | | | |
| 6. | a. | Construct the flying capacitor type Multilevel Inverters for the Permanent Magnet Brushless DC motor. | CO2 | **15** |
|  | b. | Compare the component requirements per leg of Multilevel Inverters. | CO2 | **5** |
| 7. |  | Construct a series resonant inverter with L = 50μH, C= 6μF and R = 2Ω. The DC input voltage Vs = 220V and frequency of the output voltage fo = 7kHz. The turn-off time is tq = 10μs.  (i)Determine a resonant frequency ω r and the time at which it produces the maximum load current  (ii) Explain it with the help of circuit diagram and waveforms | CO3 | **20** |
| **(OR)** | | | | |
| 8. | a. | Describe that how the structure of separate dc source Cascaded H-Bridge Multilevel Inverter is well suited for various renewable energy sources. | CO2 | **8** |
|  | b. | The parallel resonant inverter delivers a load power of PL = 1kW at a peak sinusoidal load voltage of Vp = 170V and at resonance. The load resistance is R = 10 Ω. The resonant frequency is fo =20 kHz. Determine   1. The dc input current. 2. The quality factor for the load power of 200 W when u =1.25 3. The Inductor Value 4. The Capacitor Value. | CO3 | **12** |
|  | | **Compulsory:** |  |  |
| 9. | a. | Explain the modes of Operation in Class E Resonant Inverter which is used for Low Power Applications. | CO1 | **10** |
|  | b. | Design the optimum values of L , C , Ce, and Le for the Class E inverter to operate at resonance and has Vs = 15 V and R =15 Ω . The switching frequency is fs = 50kHz. Assume Q = 8. | CO3 | **10** |

ALL THE BEST