Reg. No: | | | | | | | | | | | | |

Question Paper Code: U5301

B.E./B.Tech. DEGREE EXAMINATION, NOV 2024

Fifth Semester

Electrical And Electronics Engineering

21UEE501-POWER ELECTRONICS

(Regulations 2021)

Duration: Three hours Maximum: 100 Marks

PART A - (5 x 1 = 5Marks)

1. The three terminals of the IGBT are CO1-U

   (a) base, emitter, collector (b) gate, source, drain

   (c) gate, emitter, collector (d) base, source & drain

2. Circulating current in dual converter causes --------- CO1-U

   (a) higher than (b) lower than (c) as same as (d) negative of

3. Fully controlled converter uses---------- CO1-U

   (a) Temperature issues (b) Inductance in load circuit

   (c) out of phase voltages from both the converters (d) none of the above

4. In case of Time ratio control ---------- is varied CO1-U

   (a) 60^{o} (b) 120^{o} (c) 180^{o} (d) 90^{o}

5. A three-phase to three -phase cyclo converter requires CO1-U

   (a) Duty Cycle (b) Firing angle (c) supply frequency d) supply voltage

PART – B (5 x 3= 15Marks)

6. Why circuit turn off time should be greater than the thyrisrtor CO1 - U
7. Predict the circuits turn–off time for single phase full converter. CO2-App
8. Classify the different types of chopper with respect to commutation process CO1-U
9. Infer the is harmonic elimination by PWM? CO1-U

10. Interpret the two methods of control in ac voltage controller. CO1-U

PART – C (5 x 16= 80Marks)

11.	(a)	Sketch the turn on and turn off characteristics of Power IGBT with neat circuit diagram and waveform.	CO1-U	(16)
		Or		
	(b)	Discuss the voltage and current changes associated with SCR turn-on and turn-off.	CO1-U	(16)
12.	(a)	Develop the waveforms of a single-phase full bridge converter with RL load for continuous and discontinuous load currents	CO2-App	(16)
		Or		
	(b)	Develop the waveforms of a three phase semi converter with R load and also the output voltage waveforms for 30° and 90°.	CO2-App	(16)
13.	(a)	Draw the circuit of buck regulator and explain its working principle with necessary waveforms. Derive the expression for peak to peak ripple voltage of the capacitor that is present across the load	CO3-App	(16)
		Or		
	(b)	Discuss the fundamental principles of chopper control strategies with necessary waveform and identify its essential in power electronics?	CO3-App	(16)
14.	(a)	Demonstrate the working of a single phase full bridge inverter with relevant circuit and waveform.	CO1-U	(16)
		Or		
	(b)	Describe the working of 3 phase inverter with 180^{o} conduction mode with necessary waveform.	CO1-U	(16)
15.	(a)	Sketch and explain the operation of single phase AC voltage controller with RL Load	CO5-App	(16)
		Or		
	(b)	Draw the circuit diagram of single phase AC voltage controller with the RL load. Explain the circuit operation with necessary waveforms.	CO5-App	(16)