KUMARAGURU
college of technology
character is life

Register Number: …….

B.E DEGREE EXAMINATIONS: MAY 2015

(Regulation 2013)

Fourth Semester

MECHATRONICS ENGINEERING

U13MCT401:Industrial Electronics

Time: Three Hours **Maximum Marks: 100**

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. Power-electronic equipment has very high efficiency, because,
   a) the devices always operate in active region
   b) the devices never operate in active region
   c) the devices traverse active region at high speed and stay at the two states, on and off
   d) cooling is very efficient
2. Reverse recovery current in a diode depends upon ……..
3. In a single phase full converter for the continuous conduction, each pair of SCRs conduct
   a) $\pi + \alpha$
   b) π
   c) α
   d) $\pi - \alpha$
4. A freewheeling diode across inductive load will provide ……..
5. A single phase full bridge inverter can operate in load commutation mode in case load consists of
   a) RL
   b) RLC under damped
   c) RLC over damped
   d) RLC critically damped
6. In dc choppers the waveform for input and output voltage are respectively ……..
7. A single phase voltage controller feeds power to a resistance of 10 ohm. The source voltage is 200 V rms. For a firing angle of 90 degree, the rms value of thyristor current in amperes is
   a) 20
   b) 15
   c) 10
   d) 05
8. The cyclo-converter (CCs) require natural or forced commutation as under ……..

9. A separately excited dc motor is required to be controlled from a 3 phase source for operation in first quadrant only. The most preferred converter would

a) fully controlled converter
b) fully controlled converter with freewheeling diode
c) half controlled converter
d) sequential control of two series connected fully controlled converters

10. A delta connected induction motor being fed by a 3 phase ac to dc inverter and operated in constant V/f control mode requires during starting a……..

PART B (10 x 2 = 20 Marks)

(Not more than 40 words)

11. Draw the characteristics of GTO and mention its applications
12. Mention the importance of snubber circuits
13. Write the uses of flywheel diode in a controlled rectifier circuit
14. Draw the circuit diagram and waveform of three phase full converter
15. What are all the methods to generate PWM signals?
16. Draw the topology of Class E chopper
17. Mention the applications of AC voltage controllers
18. Define solid state relays
19. What are all the problems in dielectric heating process?
20. Name the solid state device used in a electronic regulator

PART C (5 x 14 = 70 Marks)

(Not more than 400 words)

Q.No. 21 is Compulsory

21. Explain with neat diagram protection circuits used for power semiconductor devices and also mention about the effect of EMI problems in the power semiconductor devices

22. a) (i) Explain with neat waveform working of 3 phase half converter (7)

(ii) Mention the effect of source inductance in the phase controlled converters (7)

(OR)

b) (i) Brief the purpose of thyristors triggering circuits (4)

(ii) Explain with neat diagram thyristors triggering methods (10)

23.	a)	(i)	Explain with neat diagram working principle and operation of Current source inverter	(10)
		(ii)	Mention the applications of voltage source inverter	(4)
			(OR)	
	b)	(i)	Explain the working of PWM inverter with waveform	(7)
		(ii)	Describe the working of any one regulator with neat diagram	(7)
24.	a)	(i)	Discuss about multistage sequence control with an example	(10)
		(ii)	Draw the topology of single phase AC voltage controller	(4)
			(OR)	
	b)	(i)	Brief about the principle of step down cyclo converters	(4)
		(ii)	Explain with neat diagram working of single phase to three phase Cycloconverter	(10)
25.	a)	(i)	Mention the purpose of saw tooth generator	(4)
		(ii)	Explain with an example the application of solid state switching circuit	(10)
			(OR)	
	b)	(i)	Explain how a power electronic device will be used in driving a motor	(7)
		(ii)	Describe the importance of solid state device in induction heating application	(7)

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