Register No: …….

B.E. DEGREE EXAMINATIONS: APRIL/MAY 2011

Sixth Semester

ELECTRICAL AND ELECTRONICS ENGINEERING

U07EE602: Power Electronics

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

Answer All Questions:-

PART A (10 x 1 = 10 Marks)

1. A thyristor is basically

a) PNPN device. b) a combination of diac and triac.

c) a set of SCRs. d) a set of SCRs,diac and triac.

2. A triac is a

a) 2 terminal switch. b) 2 terminal bilateral switch.

c) 3 terminal unilateral switch. d) 3 terminal bidirectional switch .

3. In a three phase half wave rectifier,each diode conducts for a duration of

a) 180° b) 120° c) 90° d) 60°

4. In a single phase full wave controlled bridge rectifier,minimum output voltage is obtained at conduction angle _____ and maximum at conduction angle_____.

a) 0°,180° b) 180°, 0° c) 0°,0° d) 180° , 180°

5. Chopper control for DC motor provides variation in

a) Input voltage. b) Frequency. c) current. d) Back emf.

6. In dc choppers, the waveforms for input and output voltages are respectively

a) both discontinuous. b) both continuous.

c) continuous, discontinuous. d) discontinuous, continuous.

7. Inverter converts

a) dc to ac. b) ac to ac. c) dc to dc. d) ac to dc.

8. In _____PWM, pulse width are generated by comparing a triangular reference voltage Vr of amplitude Ar and frequency fr with a carrier half sinusoidal voltage Vc of variable amplitude Ac and frequency 2fs.

a) Sinusoidal. b) Modified Sinusoidal. c) Single PWM. d) Multiple PWM.

9. UPFC is a

a) Compensator. b) Complete Compensator. c) Power Changer. d) Phase- angle controller.

10. The types of HVDC link

a) Monopolar and Quadpolar. b) Bipolar and tripolar

c) Monopolar and Bipolar d) Monopolar and tripolar.

PART B (10 x 2 = 20 Marks)

11. Why are IGBT becoming popular in their application to controlled converter?
12. What are the factors that influence the turn-off time of a thyristor?
13. Under what conditions a single phase fully controlled converter gets operated as an Inverter?
14. List the applications of phase controlled converters.
15. Define the term duty cycle in DC-DC converters.
16. What is two quadrant DC chopper?
17. What is VSI and CSI?
18. List the different methods of controlling the output voltage of inverter.
19. Name any two types of FACTS devices.
20. State the merits of HVDC transmission.

PART C (5 x 14 = 70 Marks)

21. (a) Discuss the transfer, output and switching characteristics of power MOSFET.

(OR)

(b) Explain the switching performance of BJT with relevant waveforms indicating clearly the Turn- on, turn-off times and their components. Also define the term SOA.

22. (a) With necessary circuit and waveforms,explain the principle of operation of three phase fully controlled bridge rectifier feeding R-L load and derive the expression for the average output voltage.

(OR)

(b) With necessary circuit and waveforms,explain the principle of operation of single phase ac voltage controller having only thyristors feeding resistive load by on-off control and phase control. Derive the expression for rms value of output voltage in both cases.

23. (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.

(OR)

(b) Draw the circuit of CUK regulator and explain its working principle with necessary waveforms in detail.

24. (a) (i) Discuss the functioning of three phase voltage source inverter supplying a balanced star connected load in 120° conduction mode of operation.

(OR)

(b) (i) Write short notes on current source inverter. (7)

(ii) Explain how inverter can be controlled using multiple and Sinusoidal PWM techniques. (7)

25. (a) Explain the operation of on line and off-line UPS in detail.

(OR)

(b) Write short notes on

(i) UPFC. (7)

(ii) Static VAR compensation. (7)

****