

B.E DEGREE EXAMINATIONS: APRIL/MAY 2014

(Regulation 2009)

Sixth Semester

ELECTRONICS AND INSTRUMENTATION ENGINEERING

EIE118: Power Electronics

Time: Three Hours**Maximum Marks: 100****Answer all the Questions:-****PART A (10 x 1 = 10 Marks)**

- Which of the following device has bidirectional current flow?
 - SCR
 - Diode
 - Triac
 - BJT
- A cut in voltage of a diode is also known as _____.
 - Forward breakdown voltage
 - Threshold voltage
 - Reverse breakdown voltage
 - None of the above
- In a single phase full converter, the output voltage during overlap is equal to _____.
 - zero
 - source voltage
 - source voltage minus the inductance drop
 - inductance drop
- In a three phase full converter, the ratio of average voltage to maximum line voltage is _____.
 - $0.9549\cos\alpha$
 - $0.9549\sin\alpha$
 - $0.4775\cos\alpha$
 - $0.9549(1+\cos\alpha)$
- A Buck converter is switched at a frequency of 1Kz with a duty ratio of 0.5 and $L= 200\text{mH}$, calculate the peak to peak ripple of the load which is fed from 100V DC voltage source.
 - 0.25A
 - 1.25A
 - 0.125A
 - 0.025A
- The input voltage of an ideal type A chopper is 220V DC, load voltage is 150V and the chopping frequency is 4 KHz. Calculate the ON period of the thyristor.
 - 170.45 μs
 - 150 μs
 - 152.5 μs
 - 185.5 μs
- In a single pulse modulation of PWM inverters fifth harmonic can be eliminated if pulse width is _____.
 - 36°
 - 120°
 - 90°
 - 45°

- In single pulse modulation of PWM inverters the pulse width is 120°. For an input voltage of 220V DC, the r.m.s value of output voltage is _____.
 - 179.63V
 - 254.04V
 - 127.02V
 - 185.04V
- _____ is a system composed of static equipment used for the AC transmission of electrical energy.
 - PWM
 - Inverter
 - Harmonics
 - Flexible alternating current transmission system
- _____ is an electrical device for providing fast-acting reactive power compensation on high-voltage electricity transmission networks.
 - HVDC transmission
 - UPS
 - Unified Power Flow Controller
 - VAR compensator

PART B (10 x 2 = 20 Marks)

- What are the various power electronic converters? Mention each with example.
- Compared to other power devices, power MOSFET is preferred in high speed application. Why?
- A three phase half controlled converter is fed from 3 phase , 400V, 50Hz source and is connected to load taking a constant current of 36A. Thyristor have a voltage drop of 1.4V.calculate the average load voltage for a firing pulse of 60°. Determine average power dissipated in each thyristor.
- What are the advantages of freewheeling diodes in a controlled rectifier?
- Give the various classifications of chopper circuits.
- What is time ratio control?
- List a few industrial applications of inverters.
- What is the need for voltage control in an inverter?
- What is static VAR compensator?
- What is off-line UPS?

PART C (5 x 14 = 70 Marks)

- (i) Explain in detail about structure, operation and static characteristics of SCR? (7)
 - (ii) What is IGBT? Give its basic structural features and working. (7)

(OR)

- (i) Give the basic integrated structure of TRIAC. Draw the IV characteristics of a TRIAC and explain the working of TRIAC. (7)

- (ii) With a neat diagram discuss about driver and snubber circuits for MOSFET? (7)
22. a) Explain 6 pulse converter with necessary diagrams.
(OR)
- b) (i) Explain 3 phase full converter with RLE load in rectifying mode inversion mode. And derive the expressions for average output voltage and r.m.s output voltage. (9)
(ii) With a neat diagram explain about the AC voltage controllers? (5)
23. a) (i) Explain type C and type D choppers in detail with necessary waveforms. (9)
(ii) Explain Boost converter in detail. (5)
(OR)
- b) With neat diagram explain the working of cuk switching mode regulator?
24. a) (i) Discuss the application of PWM technique in the inverter, bring out its use.. (7)
(ii) What is PWM? List the various PWM techniques and explain any one of them. (7)
(OR)
- b) Explain the Harmonic reduction by transformer corner lines and series resonant inverters.
25. a) Explain Uninterruptable Power Supplies (UPS) in detail.
(OR)
- b) (i) Write technical notes on HVDC transmission. (7)
(ii) Write short notes on static VAR compensator. (7)
