

Reg. No. :

--	--	--	--	--	--	--	--	--	--

**Question Paper Code: 31654**

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2017

Fifth Semester

Instrumentation and Control Engineering

01UIC504 – POWER ELECTRONICS AND APPLICATIONS

(Regulation 2013)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 2 = 20 Marks)

1. Define firing angle in the operation of SCR.
2. List the different methods to turn on the thyristor?
3. List the effects of source inductance.
4. What is the effect of freewheeling diodes in semi converter circuit?
5. Define modulation index of inverter.
6. Give the applications of DC chopper?
7. What is a step up chopper?
8. Mention the advantages of PWM control?
9. Write the applications of cycloconverter.
10. What do you mean by integral cycle control method?

PART - B (5 x 16 = 80 Marks)

11. (a) Describe the basic structure of power MOSFET and explain the principle of operation with neat diagram also discuss its switching characteristics. (16)

Or

(b) Discuss how static and dynamic equalizing circuits serve to equalize the distribution of voltage in a string of series connected SCRs. (16)

12. (a) Write brief notes on Operation of reactive power control of converters. (16)

Or

(b) (i) Summarize the working of dual converter. (8)

(ii) A three phase half wave controlled rectifier has a supply of 200V/phase. Determine the average load voltage for firing angle of  $0^\circ$ ,  $30^\circ$ ,  $60^\circ$ . Assuming a thyristor voltage drop of 1.5V and continuous load current. (8)

13. (a) With help of circuit diagrams, mode of operation and waveforms, explain the working of boost converter and derive expression for average, RMS value of output voltage and effective input resistance against duty cycle. (16)

Or

(b) Explain the principles of resonant switching based SMPS. (16)

14. (a) Describe the operation of series resonant inverter with suitable diagrams. (16)

Or

(b) State different methods of voltage control inverters. Describe about different PWM control in inverter with the significance of harmonic control. (16)

15. (a) With a neat power circuit describe the operation of single phase AC voltage controller with RL load. (16)

Or

(b) Write the objectives and necessity of matrix converters with illustrations. (16)

---