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

Question Paper Code: 35604

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2018

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. What are the different methods to turn on the thyristor?
3. Write the function of SMPS.
4. Define commutation angle or overlap angle.
5. Define modulation index of inverter.
6. Give the applications of DC chopper?
7. Identify the reason for thyristor are not preferred for inverters?
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 turn ON and OFF operations of an IGBT using basic structure. (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 0^0, 30^0, 60^0. Assuming a thysistor 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 using equivalent circuits, the operation of a three phase bridge inverter with star connected load in the 120 and 180 degree modes. (16)

Or

(b) Describe the operation of series resonant inverter with suitable diagrams. (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)

———————