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

Question Paper Code: 41654

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2016

Fifth Semester

Instrumentation and Control Engineering

14UIC504 - POWER ELECTRONICS AND APPLICATIONS

(Regulation 2014)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. _____diodes have relatively large reverse recovery times of the about 25μs.

   (a) General purpose (b) Fast recovery
   (c) Schottky (d) None of the above

2. _____ is not available in high voltage and high current ratings.

   (a) TRIAC (b) DIAC (c) SCR (d) MOSFET

3. The load current will have a tendency to flow continuously, if the load inductance is _____

   (a) small (b) large
   (c) medium (d) of any range of value

4. _____ is the minimum firing angle at which the freewheeling starts conduction in a 3φ semi converter circuit.

   (a) π/6 (b) π/2 (c) π/3 (d) π+

5. For _____ power switches in chopper circuit, it is necessary to include separate commutation circuit.

(a) SCR (b) IGBT (c) MOSFET (d) TRIAC

6. _____ type of switching resonant converters is used for high switching frequencies.

(a) ZCS (b) ZVS (c) Both (d) ZCS or ZVS

7. _____ converts ac power at input frequency to an ac power at different frequency without employing any intermediate dc stage.

(a) Inverters (b) Cycloconverters (c) Chopper (d) Rectifier

8. _____control of the inverter output voltage does not require extra circuits.

(a) Internal (b) External
(c) Both (d) Internal or external

9. _____ is used for speed control of high power ac drives.

(a) Chopper (b) Inverters
(c) Cycloconverters (d) Voltage controllers

10. The inverter of _____ mode would experience a direct short circuit through SCRs.

(a) 120° (b) 240° (c) 180° (d) none of these

PART - B (5 x 2 = 10 Marks)

11. Compare a TRIAC and a SCR.

12. State overlap period and its effect in full converter.

13. State the scheme which adjusts the pulse width.

14. Define total harmonic distortion.

15. List the application of cycloconverters.

PART - C (5 x 16 = 80 Marks)

16. (a) (i) Draw and explain the basic structure and equivalent circuit of IGBT. (8)

(ii) Describe the principle of operation of TRIAC. (8)

Or

(b) Explain the switching characteristics of SCR. (16)

17. (a) (i) List the classification of converters with circuit symbol. (8)

(ii) Elaborate the working principle of half wave rectifier with RL load. (8)

Or

(b) Describe the working principle of online and offline UPS. (16)

18. (a) Explain with neat sketch, the step up and step down chopper. (16)

Or

(b) Describe the working principle of zero controlled switching converters. (16)

19. (a) Explain the three phase inverter under 120° mode of operation. (16)

Or

(b) Discuss the working principle of current source inverter of single phase capacitor commutated inverter and auto sequential commutated inverter. (16)

20. (a) Explain the principle of operation of single phase to single phase cycloconverter with neat circuits and its waveforms. (16)

Or

(b) Describe the matrix converter. (16)

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