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

Question Paper Code: 41351

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

Fifth Semester

Electrical and Electronics Engineering

14UEE501 - POWER ELECTRONICS

(Regulation 2014)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. In the active region, while the collector-base junction is _____ biased the base-emitter is _____ biased.

   (a) forward, forward (b) forward, reverse
   (c) reverse, forward (d) reverse, reverse

2. SCR is a _____ device.

   (a) semi controlled (b) full controlled
   (c) un controlled (d) none of these

3. The advantage of using free-wheeling diode with bridge type ac/dc converter is

   (a) regenerative breaking (b) reliable speed control
   (c) improved power factor (d) reduced cost of system

4. In dual converter, the circulating current

   (a) allows smooth reversal of load current, but increase the response time
   (b) allows smooth reversal of load current with improved speed of response
   (c) does not allow smooth reversal of load current, but reduces the response time
   (d) flows if there is no interconnecting inductor

5. A step-down choppers can be used in

(a) electric traction (b) electrical vehicles
(c) machine tools (d) all the above

6. Chopper is a

(a) AC-DC converter (b) AC-AC converter
(c) DC-AC converter (d) DC-DC converter

7. In the SPWM, the modulating signal is

(a) square (b) sinusoidal
(c) triangular (d) saw-tooth

8. Single phase VSI are mainly used in

(a) power supplies (b) UPS
(c) multilevel configuration (d) all the above

9. The quality of output ac voltage of a cyclo converter is improved with

(a) increase in output voltage at reduced frequency
(b) increase in output voltage at increased frequency
(c) decrease in output voltage at reduced frequency
(d) decrease in output voltage at increased frequency

10. Which stage of the power supply uses a Zener as the main component?

(a) rectifier (b) voltage divider
(c) regulator (d) filter

PART - B (5 x 2 = 10 Marks)

11. Define latching current and holding current

12. Mention some of the applications of controlled rectifier

13. What is meant by TRC? And what are the two types of TRC?

14. Compare VSI and CSI.

15. What are the advantages and disadvantages of ac voltage controllers?

PART - C (5 x 16 = 80 Marks)

16. (a) Discuss the operating principle, output and switching characteristics of power MOSFET. (16)

Or

(b) Explain the structure, different modes of operation, characteristics and applications of TRIAC. (16)

17. (a) Describe using a power circuit and relevant waveforms the working of a single phase fully controlled half wave rectifier with RL load and derive its average and RMS output voltage. (16)

Or

(b) Explain the operation of three phase full converter and also derive the expression for its advantage output voltage. (16)

18. (a) Explain the working of current commutated chopper with aid of circuit diagram and necessary waveforms. (16)

Or

(b) Explain the operation of boost and buck-boost converter with neat circuit diagrams and waveforms. (16)

19. (a) Explain the operation of 3 phase bridge inverter for 180 degree mode of operation with aid of relevant phase and line voltage waveforms. (16)

Or

(b) Discuss the functioning of single phase CSI with neat circuit diagrams and waveforms. (16)

20. (a) Write short note on the following:

(i) Integral cycle control

(ii) Multi stage sequence control

(iii) Step up cyclo converter

(iv) Matrix converter (16)

Or

(b) Draw the circuit diagram of three phase to single phase cyclo converter and explain its operation with its necessary waveforms. (16)