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

Question Paper Code: 41553

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

Fifth Semester

Electronics and Instrumentation Engineering

14UEI503 - INDUSTRIAL ELECTRONICS

(Regulation 2014)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. For very high and ultra high frequency applications which of the following is preferred

   (a) SIT (b) IGBT (c) MOSFET (d) BJT

2. AC to DC circulating current dual converters are operated with which of the following relationship?

   (a) $\alpha_1 + \alpha_2 = 180^o$ (b) $\alpha_1 + \alpha_2 = 360^o$ (c) $\alpha_1 + \alpha_2 = 180^o$ (d) $\alpha_1 + \alpha_2 = 90^o$

3. The converter that can operate in both 3 phase and 6 phase is

   (a) 6 phase full converter (b) 6 phase semi converter
   (c) 3 phase full converter (d) 3 phase semi converter

4. Dual converter is called as _____ quadrant converter

   (a) 1 (b) 2 (c) 3 (d) 4

5. A single phase full bridge inverter can be operated in load commutation mode in case load consist of

   (a) RL (b) RLC underdamped
   (c) RLC over damped (d) RLC critically damped

6. A static switch used to obtain variable DC voltage from a constant DC voltage

(a) transistor (b) inverter (c) chopper (d) cyclo converter

7. Which braking is not possible in series motor?

(a) regenerative braking (b) dynamic braking
(c) counter current braking (d) rheostat braking

8. The concept of v/f control of inverters driving induction motor is

(a) constant torque operation (b) speed reversal
(c) reduced magnetic loss (d) harmonic elimination

9. Which of the following is used in heat sink

(a) iron (b) aluminium (c) silver (d) carbon

10. An SMPS circuit operating at 20 *kHZ* to 100 *kHZ* range uses which of the following elements

(a) Thyristor (b) TRIAC (c) UJT (d) MOSFET

PART - B (5 x 2 = 10 Marks)

11. What is commutation? What are the two main types of commutation?

12. List various applications of phase controlled converters.

13. Define the duty cycle of DC choppers.

14. What is regenerative braking?

15. Mention the different topologies of UPS.

PART - C (5 x 16 = 80 Marks)

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

Or

(b) (i) Draw the basic structure of an IGBT and explain its operation. (8)

(ii) Explain the four modes of operation of a TRIAC using relevant diagrams. (8)

17. (a) With neat sketch, explain the working principle of cyclo converters. (16)

Or

(b) Explain the operation of single phase fully controlled converter with R-L-E load with relevant circuit and wave forms. (16)

18. (a) Explain using a diagram, equivalent mode diagrams and waveforms the operation of load commutated chopper. (16)

Or

(b) (i) Explain using a diagram the operation of a series inverter and bring out its limitations. (10)

(ii) Develop the circuit of a modified series inverter. (6)

19. (a) Explain the following methods of braking of a dc motor

(i) Regenerative braking (ii) Dynamic braking (iii) Plugging (16)

Or

(b) Explain both types of static scherbius drive for operating speeds below as well as above synchronous speed with relevant circuit diagram. (16)

20. (a) Explain in details about induction heating and dielectric heating with neat sketch. (16)

Or

(b) With neat sketch, explain the working of switched mode power supply. (16)

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