KUMARAGURU
college of technology
character is life

Register Number:……..

B.E DEGREE EXAMINATIONS: NOV / DEC 2014

(Regulation 2009)

Sixth Semester

ELECTRICAL AND ELECTRONICS ENGINEERING

EEE114: Solid State Drives

Time: Three Hours **Maximum Marks: 100**

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. Battery charging is an example of ----------
   a) Continuous constant load b) Pulsating load
   c) Impact load d) Short time load
2. The heating time constant of an electrical machine gives an indication of its ---------
   a) Cooling b) Rating
   c) Overload capacity d) Short time rating
3. A fully controlled line commutated converter operates as rectifier--------
   a) In the range of firing angle $0 \leq \alpha \leq 90$ b) In the range of firing angle $90 \leq \alpha \leq 180$
   c) In the range of firing angle $\alpha \geq 180$ d) When it supplies RLE load
4. A dual converter with circulating current mode----------
   a) Has discontinuous conduction b) Has a very sluggish behaviour
   c) Difficult to maintain continuous conduction d) Easy to maintain continuous conduction
5. In a step down chopper, output voltage V_0 is ----------
   a) <Vs b) >Vs
   c) ≤ Vs d) ≥Vs
6. Constant frequency control of TRC method gives----------
   a) Low ripple content b) High ripple content
   c) Zero ripple content d) Variable ripple content

7. In CSI, the amplitude of output current does not depend on the ---------

a) Diode b) load

c) Input current d) Supply voltage

8. ---------- method is only used for large motor of 4000 kW or above.

a) Conventional Kramer system b) Static Kramer system

c) Conventional scherbius system d) Static scherbius system

9. Fractional horse power synchronous reluctance and hysteresis motors employ a ----------

a) Three phase three wire winding b) Single phase winding

c) Two phase winding d) Three phase four wire winding

10. VSI fed synchronous motor drive has-------

a) High efficiency b) Reasonable efficiency

c) Low efficiency d) Zero efficiency

PART B (10 x 2 = 20 Marks)

11. List out various components used in electric drive system.
12. Mention the necessary condition to obtain the three modes of operation of an electric drive.
13. Write the expression for average output voltage of full converter fed dc drive.
14. What is static ward-Leonard drive?
15. Define the duty cycle of chopper circuit.
16. What are the advantages in operating chopper at high frequency?
17. Compare VSI and CSI.
18. What is meant by stator resistance control?
19. What is self control mode of synchronous motor?
20. Mention some of the applications of PMSM drive.

PART C (5 x 14 = 70 Marks)

21. a) (i) Define electric drive and compare AC and DC drive. (7)

(ii) Explain the different types of loading of drives. (7)

(OR)

b) (i) Derive the mathematical condition for steady state stability. (7)

(ii) Explain four quadrant operation of an electric drive. (7)

22. a) Explain with neat circuit diagram and waveform the operation of a single phase full controlled converter fed separately excited DC motor.

(OR)

b) Draw and explain the operation of dual converter fed DC drive.

23. a) (i) Describe, with neat diagram, the operation of a four quadrant chopper. (10)

(ii) Discuss the two methods of time ratio control. (4)

(OR)

b) Explain the chopper control of series motor.

24. a) Draw and explain slip power recovery scheme applicable for three phase Slip ring Induction motor.

(OR)

b) Describe the closed loop speed control of VSI and CSI with neat diagram.

25. a) (i) Explain self control of synchronous motor drive operated with constant margin angle control. (10)

(ii) Discuss about steel rolling mill. (4)

(OR)

b) (i) Explain the concept of open loop v/f control of synchronous motor drive. (7)

(ii) Explain in detail about permanent magnet synchronous motor drive. (7)

****