Register Number: ……..

B.E., DEGREE EXAMINATIONS: MAY/JUNE 2013

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. In fan type load, torque
   a) T is constant
   b) T is proportional to ω
   c) T is proportional to ω^2
   d) T is proportional to ω^3
2. Motor does not attain steady state temperature when operating on
   a) Continuous duty
   b) Short time duty
   c) Over loading
   d) No load
3. Half controlled converter can operate in
   a) Single quadrant
   b) Two quadrants
   c) Three quadrants
   d) Four quadrants
4. Sum of the firing angles of dual converters at any time is
   a) 90°
   b) 120°
   c) 180°
   d) 240°
5. In DC drives, Type B chopper is used for
   a) Motoring
   b) Reversing
   c) Braking
   d) Starting
6. In four quadrant chopper fed DC motor, armature current can flow in
   a) One direction
   b) Two directions
   c) Three directions
   d) Four directions
7. Major Drawback of the stator voltage controller fed induction motor is
   a) Poor Efficiency
   b) Poor torque capability
   c) Complex circuit
   d) High cost
8. Controlled parameters in vector control of induction motor, are
   a) Voltage and current
   b) Current and torque
   c) Voltage and power factor
   d) Flux and torque

9. Objective of the constant V/f ratio control is to maintain the

a) Power factor high b) Air gap flux constant

c) Speed constant d) Load current constant

10. The following drive does not require four quadrant operation

a) Rolling Mill b) Crane

c) Lift d) Pump

PART B (10 x 2 = 20 Marks)

11. Draw the speed torque characteristics of hoist type load
12. Name the braking methods used for electric drives
13. Why is the input power factor of half controlled converter, better than that of fully controlled converter fed drive?
14. What are the applications of dual converter fed drives?
15. Define duty cycle of DC chopper
16. What are the quadrants of operation of four quadrant chopper fed drive?
17. What are the advantages of CSI fed induction motor drives?
18. What is slip power?
19. What is self control of synchronous motor drive?
20. Name the motors used for traction and lifts.

PART C (5 x 14 = 70 Marks)

21. a) (i) With block diagram explain the elements of electric drive system (7)

(ii) Explain the various classes of duty of electric motors (7)

(OR)

b) (i) Draw and explain the thermal model of electric motors (7)

(ii) Explain various starting methods of induction motors (7)

22. a) Explain the operation of separately excited DC motor fed by three phase fully controlled converter with neat circuit and waveforms. Obtain the expression for speed.

(OR)

b) Explain the working of single phase dual converter fed dc drive with necessary circuit and waveforms

23. a) (i) Derive the instantaneous current for type A chopper fed DC drive for continuous conduction mode (7)

(ii) A 230 V, 960 rpm, 200 A separately excited DC motor has an armature resistance of 0.02 Ω. The motor is fed from a chopper which provides both motoring and braking operations .The source has a voltage of 230 V. Assuming continuous conduction, calculate duty ratio of chopper for motoring operation at rated torque and 350 rpm (7)

(OR)

b) Explain the operation of four quadrant chopper fed DC drive with neat diagrams

24. a) (i) With neat diagram, explain VSI fed induction motor drive (7)

(ii) Explain the static rotor resistance control of induction motor (7)

(OR)

b) (i) Draw and explain any one slip power recovery scheme (7)

(ii) With block diagram explain the method of vector control of induction motor (7)

25. a) (i) Explain the V/f control of synchronous motor drive using VSI (7)

(ii) Draw and explain permanent magnet synchronous motor drive (7)

(OR)

b) (i) Explain the drives used for paper mill (7)

(ii) Give the requirements and features of the drives used for traction (7)

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