KUMARAGURU
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Register Number: …….

B.E DEGREE EXAMINATIONS: APRIL/MAY 2016

(Regulation 2013)

Sixth Semester

ELECTRICAL AND ELECTRONICS ENGINEERING

U13EET603**:** Solid State Drives

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

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. When a line commutated converter operates in the inverter mode
   a) It draws both real and reactive power from the AC supply
   b) It delivers both real and reactive power to the AC supply
   c) It delivers real power to the AC supply
   d) It draws reactive power from the AC supply
2. Motors preferred for rolling mill drive is_____
3 Stator voltage control for speed control of induction motors is suitable for
   a) fan and pump drives
   b) Drive of a crane
   c) constant load drive.
   d) running it as generator
4. Chopper control for D.C motor provides variation in armature voltage by changing _____
5. Which of the following drive can't be used for derricks and winches?
   a) DC motors with Ward Leonard control
   b AC slip-ring motors with variable resistance
   c) Pole changing squirrel cage motors
   d Universal Motors
6. Motor preferred for kiln drives is usually_____
7. Which of the following 3-phase AC-DC converter requires neutral point connection?
   a) 3-Phase semi converter
   b) 3-phase full converter
   c) 3-phase half wave converter
   d) 3-phase converter with diodes
8. When poly phase choppers are used, the output ripple will _____
9. In case of traveling cranes, the motor preferred for boom hoist is
   a) AC slip ring motor
   b) Ward Leonard controlled DC shunt motor
   c) Synchronous motor
   d) Single phase motor
10. Ward-Leonard controlled dc drives are generally used for _____

PART B (10 x 2 = 20 Marks)

(Answer not more than 40 words)

11. List the types of load torques used in electric drives.
12. What is the condition for steady state stability of motor load system?
13. Show a semi converter fed DC drive operated in quadrant IV? Justify your answer.
14. Evaluate the necessity of DC choke coil and freewheeling diode in a converter circuit.
15. Describe the advantages of chopper fed drive over converter fed drive.
16. Differentiate two quadrant and four quadrant chopper.
17. What is meant by vector control?
18. Compare CSI fed drives and VSI fed drives.
19. List any two applications of synchronous motor drives.
20. When can a synchronous motor be load commutated?

PART C (5 x 14 = 70 Marks)

(Answer not more than 400 words)

Q.No. 21 is Compulsory

21. Describe the open loop v/f control of VSI fed synchronous motor in detail.

22. (a) Define how the following speed transitions are carried out :
(i) Increase in speed in same direction.
(ii) Decrease in speed in same direction.
(iii) Speed reversal.

(OR)

(b) Illustrate about the braking of DC and AC drives.

23. (a) Explain the single phase fully controlled rectifier control of DC separately excited motor with neat waveforms.

(OR)

(b) Describe about Electrical –mechanical characteristics of commonly used electric motors.

24. (a) (i) Give details about the four quadrant operation of chopper fed drive. (8)
(ii) Discuss the different control techniques of chopper in detail. (6)

(OR)

(b) (i) Describe the braking operation of copper fed DC motor drive. (8)

(ii) Solve a 220 V, 20 A, 1000 rpm separately excited dc motor has an armature resistance of 2.5 Ω. The motor is controlled by a step-down chopper with a frequency of 1 kHz. The input dc voltage to the chopper is 250V. Identify what will be the duty cycle of the chopper for the motor to operate at a speed of 600 rpm delivering the rated torque? (6)

25. (a) Describe about the vector control for an induction motor

(OR)

(b) (i) Describe the v/f control scheme of induction motor drive with a neat diagram. (8)

(ii) Show and explain with a neat diagram of the field weakening mode control of induction motor drives. (6)

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