Register Number……

M.E. DEGREE EXAMINATIONS: APRIL / MAY 2010

Second Semester

POWER ELECTRONICS AND DRIVES

PED507: Solid State AC Drives

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

Answer ALL Questions:-

PART A (10 x 2 = 20 Marks)

1. Write four conventional method of speed control of induction motors.
2. What are the advantages of conventional rotor resistance control?
3. Mention few application of Voltage fed converter.
4. What is the need to go for V / F control?
5. Why vector control induction motor drive is called as 'a separately excited DC motor drive'?
6. Draw the block diagram of vector controlled induction motor drive and write torque equation.
7. What is direct vector control?
8. Write two methods of flux vector estimation?
9. Write the name of six types synchronous motors.
10. What is load commutated inverter?

PART B (5 x 16 =80 Marks)

11. (a) A three phase, 460V, 60Hz, four pole, star connected, induction motor, has following equivalent circuit parameters: R_S = 0.42 ohm, R'_r =0.23 ohm, $X_S = X'_r$ = 0.82 ohm, and X_m = 22 ohm, the no-load loss, which is $P_{\text{no load}}$ =60w, may be assumed constant. The rotor speed is 1750 rpm. By using approximate equivalent circuit,

Determine, a) the synchronous speed ω_s, b) the slip *s,* c) the input current *Ii,*

d) the input Power *Pi*, e) the input PF of the supply PFs.

(OR)

(b). (i) Draw the circuit diagram of static Kramer Drive and explain the function.

(ii) What are the advantages of static Kramer Drive over conventional Kramer Drive.

12. (a) (i) What is energy conservation effect by variable frequency drive, explain with suitable figures.

(ii) Draw the close loop speed control with Volts/ Hz control and slip regulation

(OR)

(b) (i) What is current fed inverter? Explain with figure.

(ii) Compare current source inverter and voltage source inverter.

13. (a) Explain the function of vector – controlled induction motor drive operates like a separately excited DC motor drive with suitable figure.

(OR)

(b) (i) What is flux vector estimation?

(ii) Draw the voltage model feedback signal estimation block diagram and explain.

14. (a) Derive the torque expression with stator and rotor fluxes of an induction motor using phasor diagram.

(OR)

(b) Draw the direct torque and flux control block diagram and explain each block.

15. (a) Draw the vector control of sinusoidal SPM with field weakening region- block diagram and explain each block.

(OR)

(b) (i) What is brushless excitation?

(ii) Draw block diagram of self –control wound field synchronous motor with load commutated current fed inverter with motoring and regeneration phasor diagram.

****