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Question Paper Code : 82109

M.E. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2013.

Second Semester

Power Electronics and Drives

PE 9222/PE 922/10233 PE 202 — SOLID STATE AC DRIVES

(Regulation 2009/2010)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. How rotating magnetic field is produced in 3-phase induction motor?

2. How breaking obtained in induction motor by regenerative breaking?

3. Draw AC voltage controller circuit for CSI fed induction motor control.

4. What is the principle in CSI fed induction motor variable frequency drive?

5. How to control speed of induction motor by static rotor resistance control method?

6. What is the effect of injection of voltage in the rotor circuit of induction motor?

7. What is DC drive analogy of vector – controlled induction motor?

8. What is field oriented control of induction machines?

9. Draw equivalent circuit of wound field cylindrical rotor motor.

10. How to control power factor in synchronous motor?

PART B — (5 × 16 = 80 marks)

11. (a) (i) Explain how torque is produced in induction motor? (8)

(ii) Describe principle of operation of constant volts frequency operation of induction motor with torque speed-curves. (8)

Or

(b) (i) Describe drive operating region of induction motor drive with torque speed curves at variable voltage and variable frequency up to field weakening region. (8)

(ii) Explain principle of working of variable stator current operation of induction motor with its torque speed curves. (8)

12. (a) With diagram explain working of six step inverter voltage control of VSI fed induction motor control. (16)

Or

(b) Describe principle of operation of closed loop variable frequency PWM inverter with dynamic braking of VSI fed induction motor control. (16)

13. (a) (i) Explain principle of operation of static scherbius drive using Cyclo converter. (8)

(ii) Describe working four modes of operation of static scherbius drive using Cyclo converter. (8)

Or

(b) (i) Explain working of static Kramer drive system. (8)

(ii) Describe how power factor improvement obtained in Kramer drive System. (8)

14. (a) (i) Explain voltage model flux control method of direct vector control method of induction motor. (8)

(ii) Explain direct vector control block diagram with rotor flux operation of induction motor. (8)

Or

(b) (i) Obtain expression for torque with stator and rotor flux in DTC. (8)

(ii) Describe principle of operation and control strategy of DTC with direct torque and flux control block diagram. (8)

15. (a) (i) Explain working of wound field synchronous motor with control block diagram of load commutated inverter drive with constant turn off angle. (8)

(ii) How to obtain V curves of synchronous motor. Explain. (8)

Or

(b) (i) With the help of diagram explain principle of operation of brushless synchronous motor excitation. (8)

(ii) Describe self controlled method of speed control of synchronous motor. (8)
