B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2011

Sixth Semester

Electrical and Electronics Engineering

EE 2352 — SOLID STATE DRIVES

(Regulation 2008)

Time : Three hours Maximum : 100 marks

Answer ALL questions

PART A — (10 × 2 = 20 marks)

1. What are the types of load torques?

2. Write down the fundamental torque equation of motor load system?

3. List out the drawbacks of ac-dc converter fed dc drive.

4. What is TRC scheme?

5. Write the transfer function of converter.

6. Write the real and reactive power equations of a balanced 3 phase

ac system.

7. What are the various applications of stator voltage control scheme?

8. Give the advantages of vector control method.

9. What is the necessity of delay unit in a open loop v/f control of synchronous

motor?

10. Define self control of synchronous motor.

PART B — (5 × 16 = 80 marks)

11. (a) Explain in detail the multi quadrant operation of low speed hoist in speed

torque plane. (16)

Or

(b) A motor drives two loads. One has rotational motion. It is coupled to the

motor through a reduction gear with a = 0.1 and efficiency of 90%. The load has a moment of inertia of 10 kg-m2 and a torque of 10 N-m. Other load has translational motion and consists of 1000kg weight to be lifted up at a uniform speed of 1.5 m/s. coupling between this load and the motor has an efficiency of 85%. Motor has inertia of 0.2 kg-m2 and runs at a constant speed of 1420 rpm. Determine equivalent inertia referred to the motor shaft and power developed by the motor. (16)

12. (a) Explain the operation of single phase fully-controlled converter fed dc separately excited motor in continuous and discontinuous modes of operation with necessary waveforms and steady state analysis. (16)

Or

(b) (i) Explain the different control techniques of chopper in detail. (8)

(ii) Discuss the four quadrant operation of DC-DC converter. (8)

13. (a) Explain the closed loop operation of armature voltage control method with field weakening mode control in detail. (16)

Or

(b) Explain the design procedure of current controller in detail. (16)

14. (a) Explain the theory of v/f control in detail. (16)

Or

(b) Explain the principle of vector control in detail with block diagram. (16)

15. (a) (i) Explain the open loop v/f control of synchronous motor in detail. (8)

(ii) Explain the concept of self controlled synchronous motor drive. (8)

Or

(b) Explain the construction and working of permanent magnet synchronous motor. (16)