(b) A 200 V, 1500 rpm, 10A separately excited dc motor has an armature resistance of 2 Ω. It is fed from a single phase fully controlled rectifier with an ac source voltage of 230V, 50 Hz. Assuming continuous conduction, calculate : **7.5**

(i) Firing angle for half the rated motor torque and 500 rpm

(ii) Firing angle for rated motor torque and (-1000) rpm

Unit III

5. (a) Discuss the various methods of starting of induction motors and compare the relative merits and demerits. **7.5**

(b) What is static rotor resistance control ? Explain closed loop speed control with static rotor resistance control. **7.5**

6. What is V/f control method ? Explain the Static Kramer method and Static Scherbius method of speed control of three phase induction motor. **15**

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B. Tech. EXAMINATION, Dec. 2017

(Seventh Semester)

(B. Scheme) (Main & Re-appear)

(EE, EEE, IC)

EE-403-B

ELECTRIC DRIVES

Time : 3 *Hours*] [*Maximum Marks :* 75

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt *Five* questions in all, selecting at least *one* question from each Unit. All questions carry equal marks.

Unit I

1. (a) What are the essential parts of electrical drives ? What are the functions of Power Modulator ? **7.5**

(b) Explain closed loop speed control scheme with inner current cointrol loop. What are various functions of inner current control loop ? **7.5**

2. (a) A motor equipped with a fly wheel has to supply a load torque of 600 N-m for 10 sec. followed by a no load period long enough for the flywheel to regain its full speed. It is desired to limit the motor torque to 450 N-m. What should be the moment of inertia of the flywheel ? The no load speed of the motor is 600 rpm and it has a slip of 8% at a torque of 400 N-m. Assume motor speed-torque characteristic to be straight line in the range of operation. Motor has an inertia of 10 kg/m^2. **7.5**

(b) What is steady state stability ? Derive the equation of inequality. **7.5**

Unit II

3. (a) Explain various methods of braking of DC shunt motors with neat diagrams. Compare their relative merits and demerits. **7.5**

(b) A DC separately excited motor is running at 800 rpm driving a load whose torque is constant. Motor armature current is 500A. The armature resistance drop and rotational losses and negligible. Magnetic circuit can be assumed to be linear. Calculate motor speed and armature current if terminal voltage is reduced to 50% and field current is reduced to 80%. **7.5**

4. (a) Draw and epxlain the four quadrant speed control of separately excited DC motor using dual converter. **7.5**

Unit IV

7. (a) What is intermittent periodic duty ? Derive an expression for overloading factor. **7.5**

(b) A motor rating is to be selected from a class of motors with heating and cooling time constant of 60 and 90 min respectively. Calculate the motor rating for sort-time duty cycle consisting of 100 kW load for 10 min. followed by no load period long enough for the motor to cool down. **7.5**

8. (a) What are the important features of Electric Drive ? Discuss. **7.5**

(b) Discuss static control of traction drives. **7.5**

Unit IV

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