Roll No. ..... Total Pages : 3

BT-6/M-20 **36163**

ELECTRIC DRIVES AND TRACTION

Paper–EE-310N

Time : Three Hours] [Maximum Marks : 75

Note : Attempt *five* questions in all, selecting at least *one* question from each unit. All questions carry marks indicated against them.

UNIT–I

1. (a) What are the various modes of closed-loop control of drives ? 7

(b) What are the various modes of operation of electric drives ? Discuss. 8

2. Discuss the various kinds of power modulators, employed in various applications of electric drives. 15

UNIT–II

3. (a) Formulate the equations for discontinuous conduction of single-phase half-controlled rectifier control of dc separately excited motor. 7

(b) A 220 V, 200 A, 800 rpm dc separately excited dc motor has an armature resistance of 0.06 W. The motor armature is fed from a variable voltage sources when the motor is operating in regenerative braking at 80% of the rated motor torque and 600 rpm. 8

4. (a) Discuss the commonly used dc motors and formulate their speed and torque equations. 7

(b) Explain the starting of a dc shunt motor. Discuss any *one* such starting method in brief. 8

UNIT–III

5. (a) Describe the various starting methods employed for squirrel cage induction motor. 8

(b) Discuss the rotor-resistance method of speed control of induction motor. 7

6. (a) Why is speed control required in induction motor ? Discuss the static resistance control method in detail. 9

(b) Explain the plugging method of braking used in induction motor. 7

UNIT–IV

7. (a) Explain the duty cycle curves of traction drives. 7

(b) List and explain the advantages of using electric braking instead of mechanical braking. 8

8. (a) A train service consists of following :

Uniform acceleration of 1 kmphps for 2 min.

Free running for 30 min.

Coasting for 2 min. at a deceleration of 0.1 kmphps Uniform braking at 1.2 kmphps to stop.

A stop of 5 min.

Calculate :

(i) Distance between the stations.

(ii) Scheduled speed. 8

(b) What is the difference between main line train service and local train service ? Why a locomotive is preferred for the main line train service and motor coaches for the suburban train service ? 7