Sub Code: NEN-701

4 0 0 **Paper Id:**

Printed pages:

B TECH (SEM 7) THEORY EXAMINATION 2017-18 **ELECTRIC DRIVES**

Note: (i) Attempt all questions. If required any missing data; then choose suitably.

Time: 3 Hours

(ii) All questions carry equal marks.

SECTION -A

1. Attempt all question in brief.

- a) Define term Wind age torque
- b) Define term dynamic torque.
- c) What is value of slip when motor is at standstill?
- d) What is meant by classes of duty of motor.
- e) How you can change speed of separately excited dc motor.
- f) What is intermittent periodic Duty of machine?
- g) Write name plate detail of 3 phase induction motor.
- h) What information we get from frame size of motor.
- i) What is meant by heating time constant of motor?
- i) Define passive load torques and active load torques.

SECTION -B

- 2. Attempt any three parts of the following
 - a) Explain dynamic braking for separately excited DC motor.
 - b) Explain regenerative braking for separately excited DC motor.
 - c) Explain plugging for separately excited DC motor
 - d) Drive expression energy consumption $E = 0.5 \text{ Jw}_0^2$ on no load during starting of induction motor.
 - e) Describe four quadrant operation of motor for hoist load with illustrative figures for each. Show clearly the direction of motor torque, load torque, and speed for each quadrant.

SECTION -C

- 3. Attempt any one parts of the following
 - a) A drive has the following parameters. T = 150-0.1N, N-m, where N is the speed in rpm. Load torque $T_1 = 100$, Nm initially the drive is operating in steady state. The characteristics of load torque are changed to $T_1 = -100$, N-m. Calculate initial and final equilibrium speeds.
 - b) Explain different type of braking of induction motor
- 4. Attempt any one parts of the following
 - a) Drive expression energy consumption $E = 0.5 \text{ Jw}_0^2$ on no load during starting of dc motor.

(2x10=20)

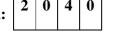
(10x3=30)

(10x1 = 10)

(10x1 = 10)



Total Marks: 100



- b) A 220 V, 970 rpm, 100 A dc separately excited motor has an armature resistance of 0.05 ohms. It is broken by plugging from an initial speed of 1000 rpm. calculate
 - a. Value of resistance to be placed in armature circuit to limit braking current to twice the full load value.b. braking torque
- 5. Attempt any **one** parts of the following
 - a) What are components of load torque and explain each .
 - b) Draw the block diagram of an electric drive. Explain the function of each.

6. Attempt any **one** parts of the following

- a) What are the reasons for using load equalization in an electrical drives?
- b) A rolling mill driven by thyristors converter –fed dc motor operates on a speed reversing duty cycle. Motor field current is maintained constant at the rated value. Moment of inertia referred to the motor shaft is 10000 kg-m². Find torque during speed reversal from 200 to -200 rpm in 5 sec.
- 7. Attempt any **one** parts of the following
 - a) Derive the thermal model of motor for heating and cooling.
 - b) A 220 volt, 200 A, 800 rpm dc separately excited motor has an armature resistance of 0.06Ω . The motor armature is fed from a variable voltage source with an internal resistance of 0.04Ω . calculate internal voltage of the variable voltage source when motor is operating in regenerative braking at 80% of rated motor torque and 600 rpm.

(10x1 = 10)

(10x1 = 10)

(10x1 = 10)