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B TECH

(SEM 7) THEORY EXAMINATION 2017-18

ELECTRIC DRIVES

ARYAN

Time: 3 Hours *Total Marks: 100*

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

(ii) All questions carry equal marks.

SECTION -A

1. Attempt all question in brief. (2x10=20)

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?
j) Define passive load torques and active load torques.

SECTION -B

2. Attempt any three parts of the following (10x3=30)

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 $E = 0.5\ Jw_o^2$ 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 (10x1 =10)

a) A drive has the following parameters. $T = 150\text{-}0.1N$, N-m, where N is the speed in rpm. Load torque $T_l = 100$, N-m initially the drive is operating in steady state. The characteristics of load torque are changed to $T_l = -100$, 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 (10x1 =10)

a) Drive expression energy consumption $E = 0.5\ Jw_o^2$ on no load during starting of dc motor.
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 (10x1 =10)

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 (10x1 =10)

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-m^2. Find torque during speed reversal from 200 to -200 rpm in 5 sec.

7. Attempt any one parts of the following (10x1 =10)

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 0.06 Ω . The motor armature is fed from a variable voltage source with an internal resistance of 0.04 Ω . calculate internal voltage of the variable voltage source when motor is operating in regenerative braking at 80% of rated motor torque and 600 rpm