

30/4/2016

8E 8042

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8E 8042

B.Tech. VIII Semester (Main/Back) Examination, April/May 2016

Electrical and Electronics Engineering

8EX2A Electric Drives & Their Control

Common With 8EE2A

Time : 3 Hours

Maximum Marks : 80

Min. Passing Marks : 24

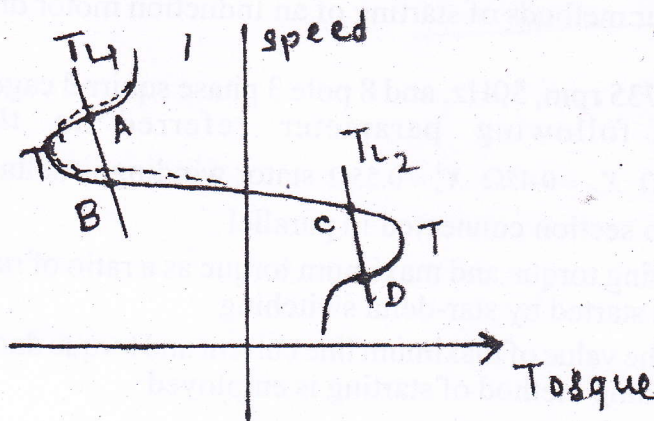
Instructions to Candidates:

Attempt any **five** questions, selecting one question from **each unit**. All questions carry equal marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.)

Units of quantities used/calculated must be stated clearly

Unit - I

1. a) What is the concept of steady state stability explain. Also comment on the stability of the operating point A,B,C,D in the given plot of speed v/s motor and load torques



T : Motor Torque

T_L : Load Torque

- b) Drive the equivalent values of drive parameter
- For loads with rotational motion
 - For loads with translation motion

OR

1. a) Explain the concept of load equalization
b) Explain the speed torque convention and multi-quadrant operation of electrical drive with a suitable example

Unit - II

2. a) Explain the following braking method for D.C. series and separately excited motors
 - i) Dynamic braking
 - ii) Plugging
- b) A 200V, 10.5 A, 2000 rpm shunt motor has the armature and field resistance of 0.5 and 400 Ω respectively. It drives a load whose torque is constant at rated motor torque. Calculate motor speed if the source voltage drops to 175V

OR

2. a) A 200V, 875 rpm, 150A separately excited dc motor has an armature resistance of 0.06 Ω . It is fed from a single phase fully controlled rectifier with an AC source voltage of 220V, 50 Hz assuming continuous conduction calculate
 - i) Firing angle for rated motor torque and 750 rpm
 - ii) Motor speed for $\alpha=160^\circ$ and rated torque
- b) Explain the chopper control of separately excited dc motors for
 - i) Motoring control
 - ii) Regenerative braking control

Unit - III

3. a) Explain the any four methods of starting of an Induction motor drive
- b) A 2200V, 2600kW, 735 rpm, 50Hz, and 8 pole 3 phase squirrel cage induction motor has the following parameter referred to the stator $R_s = 0.075\Omega$ $R_r = 0.1\Omega$ $X_s = 0.45\Omega$ $X_r = 0.55\Omega$ stator winding is delta connected and consists of two sections connected in parallel
 - i) Calculate starting torque and maximum torque as a ratio of rated torque. If the motor is started by star-delta switching
 - ii) What will be the value of maximum line current and torque during starting if the part winding method of starting is employed

OR

3. a) A 400V star connected 3 phase 6 pole 50 HZ induction motor has following parameter referred to the stator $R_s = R_r = 1\Omega$ $X_s = X_r = 2\Omega$ for regenerative braking operation of the motor determine
 - i) Maximum overhauling torque it can hold and range of speed for safe operation
 - ii) Speed at which it will hold an overhauling load with a torque of 100 N-m

- b) Discuss the operation of Voltage Source Converter (VSI) control for an induction motor drive

Unit - IV

4. Explain the following
- a) Static rotor resistance control
 - b) Static kramer drive

OR

4. Explain the following
- a) Slip power recovery
 - b) Stator scherbius drive

Unit - V

5. Explain the following with neat clean sketch
- a) Regenerative braking of synchronous motor with VSI
 - b) Dynamic braking of synchronous motor with VSI

OR

5. Explain the following
- a) Control of synchronous motor using Current Source Inverter(CSI)
 - b) VSI fed self controlled synchronous motor drive
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