



(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID 120701/121756

Roll No.

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B. Tech.

**(SEM. VII) (ODD SEM.) THEORY
EXAMINATION, 2014-15
ELECTRIC DRIVES
(ELECTRICAL ENGG.)**

Time : 3 Hours]

[Total Marks : 100

- 1 Attempt any four parts of the following : $5 \times 4 = 20$
- a) Draw the block diagram of an electric drive. Explain the function of Power modulator in detail.
 - b) State the advantages of drive system. Give some applications with suitable drive system.
 - c) Illustrate the Drive characteristics in detail with applications.
 - d) Explain the constant torque and constant power characteristics.
 - e) Elucidate the multi-quadrant operation of drive system.
 - f) Explain the components of motor-load dynamics.

2 Attempt any **two** parts of the following : $10 \times 2 = 20$

- a) Discuss the dynamics of motor load system and also derive the relations for motor- load torque system.
- b) Combine the speed torque characteristics of various load and motor and comment on steady state stability of them.
- c) Write short notes on classes of Duty in detail with examples.

3 Attempt any **two** parts of the following : $10 \times 2 = 20$

- a) A 230V, 500 rpm, 100A separately excited dc motor has an armature resistance 0.1Ω is now coupled to an overhauling load with a torque of 800 N-m. Determine the speed at which the motor can hold the load by regenerative braking. Neglect the motor's rotational losses.
- b) Explain the various methods of braking can be applied to induction motor. And also state what kind of braking is more effective, justify it.

- c) Derive the expression to calculate the energy loss during starting of Induction motor and also State the various methods used to used to reduce the energy loss during starting.

4 Attempt any **two** parts of the following : $10 \times 2 = 20$

- a) A 200 V, 875 rpm, 150 A separately excited dc motor has an armature resistance of 0.06 ohms. It is fed from a single phase fully controlled rectifier with an ac source voltage of 220V, 50HZ assuming continuous conduction. Calculate
 - i) Firing angle for rated motor torque and 750 rpm.
 - ii) Firing angle for rated motor torque and (-500 rpm)
- b) Explain the operation of separately excited DC motor Drive which is excited by two converters simultaneously.

- c) A 230V, 100rpm, 20A dc separately excited motor has the armature resistance and inductance of $1\ \Omega$ and 50mH, respectively. The motor is controlled in regenerative braking by a chopper operating at 600Hz.
- i) Calculate the motor speed and the regenerated power for $\eta=0.5$ and the rated torque.
- ii) What is the maximum armature current ripple?

5 Attempt any two parts of the following : $10 \times 2 = 20$

- a) Explain how the Static Scherbius drive is used in slip power recovery scheme.
- b) Describe in detail about speed control of self controlled synchronous motor drives.
- c) Elucidate the operation of Brushless dc motor drive in detail.