



(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 : $5 \times 4 = 20$
- Draw the block diagram of an electric drive. Explain the function of Power modulator in detail.
 - State the advantages of drive system. Give some applications with suitable drive system.
 - Illustrate the Drive characteristics in detail with applications.
 - Explain the constant torque and constant power characteristics.
 - Elucidate the multi-quadrant operation of drive system.
 - 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 : 10×2=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.