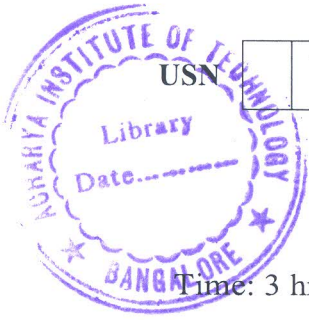


CBGS SCHEME



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15MT554

Fifth Semester B.E. Degree Examination, June/July 2019

Drives and Controls

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. What are the advantages of electrical drives? (06 Marks)
- b. With a neat block diagram explain the components of general electric drive system. (06 Marks)
- c. Give comparison between AC drives and DC drives. (04 Marks)

OR

- 2 a. What are the various components of load torque? Explain. (06 Marks)
- b. Explain the three modes of operation of electrical drives. (10 Marks)

Module-2

- 3 a. Explain about steady stability of on electric drive. (08 Marks)
- b. Explain load equalization in electric drives. How can the load equalization be done for fluctuating loads? (08 Marks)

OR

- 4 a. A motor operates on a periodic duty cycle of a locked period of 20 min and a no-load period of 10min. The maximum temperature rise is 60°C heating and cooling time constants are 50 and 70 minutes respectively. When operating continuously on no-load the temperature rise is 10°C determine :
 - i) Minimum temperature during the duty cycle
 - ii) Temperature when the motor is loaded encountered. (08 Marks)
- b. Explain briefly the various classes of motor duty as per load time variations encountered. (08 Marks)

Module-3

- 5 a. Describe the regenerative electrical braking for motors. (06 Marks)
- b. A 200V, 875 rpm, 50A, separately excited dc-motor has an armature resistance 0.06Ω and an inductance of 2.85mH. It is fed from a single phase fully controlled bridge rectifier with an AC source voltage of 220V, 50Hz, calculate the motor speed for $\alpha = 120^\circ$ and $T = 1200 \text{ N-m}$. (10 Marks)

OR

- 6 a. With a neat circuit diagram and relevant waveform describe the control of separately excited DC motor using three-phase fully-controlled bridge rectifier. (10 Marks)
- b. A 230V, 960rpm and 200A separately excited DC motor has an armature resistance of 0.02Ω . The motor is fed from a chopper which provides both motoring and braking operations, and braking is dynamic braking with a braking resistance of 2Ω . The source voltage is 230V. Calculate duty ratio of chopper for a motor speed of 600rpm and braking torque of twice the rated value. (06 Marks)

Module-4

- 7 a. Derive an expression for the torque when the induction motor is controlled by a current source inverter at fixed frequency. (06 Marks)
- b. A 440V, 50Hz, 6pole, 950rpm, Y-connected induction motor has following parameters referred to stator : $R_s = 0.5\Omega$, $R_r = 0.4\Omega$, $X_s = X_r = 1.2\Omega$, $X_m = 50\Omega$ motor is driving a fan load, torque of which is given by $T_L = 0.0123Wm^2$. Now phase of motor fails. Calculate motor speed and current. Will it be safe to run motor for a long period? (10 Marks)

OR

- 8 a. Draw the circuit diagram and explain working of slip power recovery system using solid state scherbious system. (08 Marks)
- b. With neat figure/current diagram discuss the following methods used to start the induction motor.
- i) Star delta starter method
- ii) Rotor resistance starter. (08 Marks)

Module-5

- 9 a. Write a technical note on textile mill drives and cement mill drives. (08 Marks)
- b. Explain loom motors, card motors, and spinning motors with their selection for particular operation/function and their ratings for rolling mill drives. (08 Marks)

OR

- 10 a. Explain the requirements of paper machine drive. (05 Marks)
- b. Describe the motors used in coal and mining industry. (05 Marks)
- c. Mention the main requirements of electric motors used for traction work and explain suitability of DC series motor for traction. (06 Marks)
