R15

Code No: 126ZJ

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech III Year II Semester Examinations, July/August - 2021

STATIC DRIVES

(Electrical and Electronics Engineering)

Time: 3 hours **Max. Marks: 75**

Answer any five questions

All questions carry equal marks

1.a) Explain speed-torque characteristics of a single phase fully controlled converter connected to separately excited D.C. motor with continuous current operation. Draw the relevant waveforms.

b) The speed of a 50kW, 500V, 120A, 1500 rpm separately excited d.c. motor is controlled by a three phase full converter fed from 400V, 50Hz supply. Motor armature resistance is 0.1Ω. Find the range of firing angle required to obtain speeds between 1000 rpm and (-1000) rpm at rated torque. [8+7]

2.a) Explain the speed-torque characteristics of a dc series motor connected to a three phase semi controlled converter.

b) A series motor is supplied from a full converter whose $\alpha=65^0$, 1-ϕ supply of 230 V, 50Hz frequency. The armature and field resistance together equal 2Ω. The torque constant M_{af} is 0.23 H and the load torque is 20 N-m. Neglect damping and find the average armature current and speed. [8+7]

3. With neat circuit diagram and waveforms, explain dynamic braking, regenerative braking and plugging of separately excited motor. [15]

4. Explain the four quadrant operation of D.C motors by dual converters. [15]

5.a) Explain principle of operation of two quadrant chopper fed dc series motor.

b) Explain closed loop control of DC motors by choppers. [7+8]

6.a) Describe four quadrant chopper fed dc separately excited motor.

b) Draw and explain output voltage and current waveforms of chopper fed dc separately excited motor. [7+8]

7.a) Write short notes on static Kramer drive.

b) Explain principle of operation of static scherbius drive. [8+7]

8. Describe the open-loop and closed loop methods of speed control of a synchronous motor using VSI. [15]

---ooOoo---