R13

Code No: 126AJ

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year II Semester Examinations, December - 2017
STATIC DRIVES
(Electrical and Electronics Engineering)

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

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART – A

(25 Marks)

1.a)	What are the advantages of three phase converters over single phase converter?	[2]
b)	Draw the schematic diagram of a Electrical Drive System.	[3]
c)	Draw dual converter fed d.c motor?	[2]
d)	State the advantages of closed loop of operation d.c drives.	[3]
e)	Mention the advantages of chopper fed drives.	[2]
f)	What are the different types of control strategies in a D.C chopper?	[3]
g)	What are the advantages of static Kramer drive?	[2]
h)	What is meant by V/F control?	[3]
i)	What do you mean by PWM technique?	[2]
j)	What are the advantages of self control of synchronous motor?	[3]

PART – B

(50 Marks)

2.a) Explain the concept of constant torque control and constant power control.
b) A single phase half controlled converter is fed from a 120V, 60Hz supply and provides a variable dc voltage at the terminals of a d.c motor. The thyristor is triggered continuously with a firing angle of $\alpha = 60^0$. Resistance of armature circuit is 10Ω. The motor speed is considered constant so back emf is 60V. Find the value of armature current, neglecting armature inductance. [5+5]

OR

3.a) Explain the operation of dc separately excited motor fed by 1-ϕ full converter during motoring mode.
b) Explain the speed-torque characteristics of separately excited d.c motor connected to three phase semi controlled converter. [4+6]

4.a) Explain the concept of plugging in separately excited d.c motor.
b) Explain the four quadrant operation of d.c.motor by dual converter. [4+6]

OR

5. Explain the concept of Rheostat braking in (a) Separately excited d.c. motor (b) Series excited d.c motor. [5+5]

6.a) Deduce the mathematical expression for minimum and maximum currents for class A chopper operated d.c motor with back emf.

b) A separately excited dc motor with armature resistance of 0.01Ω with dc supply 220V, 100A, 1000rpm is fed with chopper control for its motoring operation. Calculate the duty ratio of chopper at rated torque with speed of 500rpm for its motoring operation. [6+4]

OR

7.a) Explain the operation of four-quadrant type chopper.

b) A 230v separately excited dc motor takes 50A at a speed of 800rpm. It has armature resistance of 0.4Ω. This motor is controlled by a chopper with an input voltage of 230V and frequency of 50hz. Calculate the speed of regenerative braking operation at duty ratio of 0.4. [6+4]

8.a) Describe the control of 3-ϕ I.M by using A.C voltage controller.

b) Explain with suitable block diagrams the various types of VSI – controlled Induction motor drive. [5+5]

OR

9.a) Explain static rotor resistance technique to control the speed of wound rotor induction motor.

b) Explain concept of Slip Power recovery. [6+4]

10.a) Explain the closed loop control of CSI fed synchronous motor drives.

b) Explain the cycloconverter fed synchronous motor drive. [5+5]

OR

11.a) Discuss the various methods of speed control of synchronous motor in detail.

b) Describe the speed control of synchronous motor using VSI. [5+5]

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