



BTECH
(SEM VII) THEORY EXAMINATION 2023-24
ELECTRIC DRIVES

TIME: 3 HRS

M.MARKS: 100

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt all questions in brief.

Q no.	Question	Marks	CO
a.	List any four different types of motors used in Electric drive?	2	1
b.	Differentiate between AC drive and DC drive.	2	1
c.	Mention the necessity of power rating in electric drives.	2	2
d.	Why Steady state stability of Electric Drive is required?	2	2
e.	Write the essential condition for regenerative braking.	2	3
f.	List power electronic converters used for DC machine control.	2	3
g.	Discuss the impact of current ripples in motor operation.	2	4
h.	Draw circuit for rectifier control of dc series motor.	2	4
i.	What do you mean by slip power recovery control in electric drives?	2	5
j.	List the power electronic converters used for AC machine control.	2	5

SECTION B

2. Attempt any three of the following:

a.	Explain the various components of Load Torque with diagram.	10	1
b.	What are the reasons for using load equalization in an Electric Drive? Explain.	10	2
c.	Explain in details different methods of reducing energy loss during starting?	10	3
d.	Discuss in detail the chopper control of separately excited dc motor and dc series motor with suitable example.	10	4
e.	Write short notes on following motors used in Electric Drives: (i) Switched Reluctance Motor (ii) Brushless DC Motor	10	5

SECTION C

3. Attempt any one part of the following:

a.	Explain in details the multi-quadrant operations of an electric drive with suitable example.	10	1
b.	Explain in details Constant torque and constant power operation with suitable example.	10	1

4. Attempt any one part of the following:

a.	Discuss in detail the steady state stability of Electric Drive with suitable example	10	2
b.	Write short notes on determination of motor power rating for continuous duty, short time duty and intermittent duty operation with suitable example.	10	2

5. Attempt any one part of the following:

a.	A 220V, 970rpm, 100A dc separately excited motor has an armature resistance of 0.05ohm. It is braked by plugging from an initial speed of 1000rpm. Calculate the resistance to be placed in armature circuit to limit the current to twice the full load value.	10	3
b.	Prove that the energy loss in starting of Induction machine at no load is equal to kinetic energy absorbed by the rotor.	10	3

6. Attempt any one part of the following:

a.	A 200V, 1000rpm, 200A separately excited dc motor with armature resistance of 0.02 ohm. It is fed from the chopper which provides both motoring and braking operations and the source voltage is 200V. Calculate the duty cycle of the chopper for	10	4
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	(i) Motoring operation at rated torque and 350 rpm.		
	(ii) Braking operation at rated torque and 350 rpm.		
b.	Explain the operation of rectifier controlled separately excited dc motor with suitable diagram and deduce the expression for current and speed.	10	4

7. Attempt any *one* part of the following:

a.	Write short notes on the following with suitable example- (a) Static Voltage control scheme. (b) static frequency control scheme	10	5
b.	What do you mean by V/F method of speed control of induction motor? Explain V/F control with suitable example for constant torque and constant power operation of an electric drive.	10	5

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