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BTECH
(SEM VII) THEORY EXAMINATION 2024-25
ELECTRIC DRIVES

TIME: 3 HRS

M.MARKS: 100

Note: Attempt all Sections. In case of any missing data; choose suitably.

SECTION A

1. Attempt all questions in brief. 2 x 10 = 20

Q no.	Question	CO	Level
a.	Discuss the different components of electric drive.	1	K2
b.	Discuss the role of power electronic converters in electric drives.	1	K2
c.	Define steady state stability of electric drives.	2	K1
d.	Name four types of mechanical loads.	2	K1
e.	Explain why electric braking is preferred over mechanical braking in certain applications?	3	K4
f.	Define dynamic braking in the context of electric drive.	3	K1
g.	Define firing angle and extinction angle in power electronic converters.	4	K1
h.	Explain the relation between the power factor and distortion factor in power converters.	4	K4
i.	Differentiate between VSI and CSI in static frequency control.	5	K4
j.	Explain the fact that voltage control affects the speed of an induction motor?	5	K4

SECTION B

2. Attempt any three of the following: 10 x 3 = 30

Q no.	Question	CO	Level
a.	Explain the characteristics of active and passive load.	1	K2
b.	Define load equalization. Why is it critical in electric drive systems?	2	K1
c.	Explain the concept of plugging in DC motor. What precautions are necessary to avoid damage during plugging?	3	K4
d.	Discuss how the firing angle of the converter affect the speed and torque of the motor.	4	K2
e.	Explain the operation of Brushless DC motor drive in detail.	5	K6

SECTION C

3. Attempt any one part of the following: 10 x 1 = 10

Q no.	Question	C O	Level
a.	Explain the concept of speed-torque conventions in electric drives.	1	K2
b.	Classify load torque based on its nature and provide examples for each type.	1	K2

4. Attempt any one part of the following: 10 x 1 = 10

Q no.	Question	C O	Level
a.	Explain why the inertia of a load affect the dynamics of a motor-load combination?	2	K2
b.	Describe the process of determining motor power rating for short-time duty.	2	K2

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5. Attempt any one part of the following: 10 x 1 = 10

Q no.	Question	CO	Level
a.	Describe dynamic braking in three-phase induction motor. What additional components are required to implement it?	3	K2
b.	Explain the principle of plugging in three-phase induction motor. Also discuss its impact on the motor operation?	3	K2

6. Attempt any one part of the following: 10 x 1 = 10

Q no.	Question	CO	Level
a.	Explain the impact of varying the firing angle of the rectifier on the performance of a DC series motor.	4	K4
b.	Explain the working of a dual converter in motoring and braking modes for a separately excited DC motor.	4	K4

7. Attempt any one part of the following: 10 x 1 = 10

Q no.	Question	CO	Level
a.	Differentiate between Voltage Source Inverter (VSI) and Current Source Inverter (CSI) in the context of induction motor drive.	5	K2
b.	Describe the working principle of a static rotor resistance control scheme and its impact on efficiency.	5	K2