

<b>Scheme of Valuation/Answer Key</b>		
(Scheme of evaluation (marks in brackets) and answers of problems/key)		
<b>APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY</b>		
SIXTH SEMESTER B.TECH DEGREE EXAMINATION, APRIL 2019		
<b>Course Code: EE308</b>		
<b>Course Name: Electric Drives</b>		
Max. Marks: 100		Duration: 3 Hours
<b>PART A</b>		
<i>Answer all questions, each carries 5 marks.</i>		Marks
1	Definition of Electric Drive-1marks Block diagram-2 marks Explanation of Block diagram-2 marks	( 5 )
2	Explanation of the armature voltage control and field weakening mode control of separately excited DC motor drive system - 5 marks	( 5 )
3	Chopper circuit and waveforms -3 marks explanation for the regenerative braking of a DC motor-2 marks	( 5 )
4	Explanation of speed control scheme of IM with stator voltage-4marks Disadvantages- 1 marks	( 5 )
5	Comparison of CSI fed IM drive with VSI fed IM drive(any five points) -5 marks	( 5 )
6	Explanation of the Park's transformation- 3 marks Transformation matrix-2 marks	( 5 )
7	Block diagram for the variable frequency control of SM drive in the self-controlmode-3 marks Explanation-2 marks	( 5 )
8	V/F control characteristics in torque-speed plane -3 marks Explanation-2 marks	( 5 )
<b>PART B</b>		
<i>Answer any two full questions, each carries 10 marks.</i>		
9	a) List components of Load Torque -2 marks Explanation of each components with figure-3marks	( 5 )
	b) Derivation of the mathematical condition for steady state stability-5 marks	( 5 )
10	Circuit of three phase fully controlled rectifier for DC motor- 2 marks Waveforms for motoring and braking-3+3=6 marks	( 10 )

		Explanation for the motoring and braking operation-2 marks	
11		Firing angle for rated motor torque and 750 rpm = $29.3^{\circ}$ – 4 marks Firing angle for rated motor torque and -500 rpm = $120^{\circ}$ – 4 marks Motor speed for firing angle $\alpha=160^{\circ}$ and rated torque is -893.2 rpm– 2 marks	( 10)
<b>PART C</b>			
<i>Answer any two full questions, each carries 10 marks.</i>			
12		Diagram of four quadrant chopper fed separately excited DC motor(or RLE load) - 2 marks Explanation of four mode of operation with circuits showing conducting devices in each mode and with waveforms marking conducting devices- 2 marks each (4x2=8marks)	( 10)
13		Diagram for closed loop static rotor resistance control method- 4 marks Explanation-4 marks Disadvantages – 2 marks	(10 )
14		Diagram for the static Kramer scheme for the speed control- 3 marks Explanation for the speed control – 3 marks Explanation with graph for the firing angle control of thyristor bridge with constant motor field-4 marks	(10 )
<b>PART D</b>			
<i>Answer any two full questions, each carries 10 marks.</i>			
15	a)	Circuit and waveform of CSI fed IM drive- 3 marks Explanation- 2 marks	(5)
	b)	Figure of CSI fed IM drive.....(2 marks) Explanation for regenerative braking and multiquadrant operation – 3 marks	(5)
16	a)	Classification of different types of PMSM	(5)
	b)	Block diagram of the field oriented control (FOC) of an AC motor-3 marks Explanation- 2 marks	(5)
17		Schematic block diagram of microprocessor based PMSM drive – 6 marks Explanation – 4 marks	(10 )
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