

		<b>SCHEME OF VALUATION</b>	<b>Total Pages:2</b>
Reg No.:			Name:
<b>APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY</b>			
FOURTH SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2018			
<b>Course Code: EE202</b>			
<b>Course Name: SYNCHRONOUS AND INDUCTION MACHINES (EE)</b>			
Max. Marks:100			Duration: 3 Hours
<b>PART A</b>			
<i>Answer all questions, each carries 5 marks.</i>			Mark s
1		Comparison of construction & performance (5 marks)	( 5 )
2		Definition (2 marks). Effects at lagging, leading and upf loads (3 marks)	( 5 )
3		Phasor diagram (3 marks), Derivation (2 marks)	(5)
4		Sketch (2 marks), Explanation (3 marks).	(5)
5		Need for starter (2 marks), Principle of operation of star- delta starter (3 marks)	(5)
6		<b>Sketch (2 marks), Explanation of parameters (3 marks)**</b>	(5)
7		Principle of operation (3 marks), Advantages over synchronous motors (2 marks)	(5)
8		Reason (2 marks), techniques used for starting (3 marks)	(5)
<b>PART B</b>			
<i>Answer any two full questions, each carries 10 marks</i>			
9	a)	Definition (2 marks) + derivation (2 marks)	( 4 )
	b)	$K_p = 0.9659$ (1 mark), $K_d = 0.9659$ (1 mark), $T_{ph} = 100$ (1 mark), $f = 50$ Hz (1 mark), $E_{ph} = 1035.6$ V (2 marks)	( 6 )
10	a)	Plotting characteristics (3 marks), Potier triangle & parameters (3 marks), phasor diagram (2 marks), regulation - 4.85 % (2 marks)	(10 )
11	a)	Effect of harmonics (2 marks), Minimization Techniques – 2 marks	(4)
	b)	$I_L = 14.4 < -36.86^\circ$ A (1 mark), $E = 341.7 < 18.9^\circ$ V, $\delta = 18.9^\circ$ (3 marks), Voltage regulation = 47.98% (2 marks)	(6)
<b>PART C</b>			
<i>Answer any two full questions, each carries 10 marks.</i>			
12	a)	Circuit diagram (1.5 marks), Procedure (2.5 marks)	( 4 )
	b)	$I_a = 26.6$ A (1 mark), $E_{ph} = 254.46 < -11.4^\circ$ V (2 marks), $P_m = 16.201$ kW (3 marks)	( 6 )
13	a)	Circuit diagram (2 marks), Procedure (2 marks)	(4)
	b)	$N_s = 1000$ rpm, $s = 3$ %, $N_r = 970$ rpm, Shaft power output = 15.236 kW (1.5 marks), rotor copper loss = 0.5026 kW (1.5 marks), Input = 17.4546 kW (1.5 marks), Efficiency = 87.29% (1.5 marks)	(6)

14	a)	Figure of one set (2 marks), Effect of change in rotor resistance (2 marks)	(4)
	b)	$I_A = 150 \angle -28.98^\circ$ A, $\cos \Phi_A = 0.8748$ lag, (1.5 marks), $I_T = 328 \angle -36.86^\circ$ A, $I_B = 180.6 \angle -43.14^\circ$ A, $\cos \Phi_B = 0.7264$ lag (1.5 marks) $E_A = 4776 \angle 15.49^\circ$ V, $E_B = 5560 \angle 16^\circ$ V, (3 marks)	(6)
<b>PART D</b>			
<i>Answer any two full questions, each carries 10 marks</i>			
15	a)	Definition (2 marks), Causes & elimination (3 marks)	(5)
	b)	Figure (2 marks), method of determination of input current, power factor and efficiency - (3 marks)	(5)
16	a)	Circle diagram (3 marks), FL current $\sim 37$ A & power factor $\sim 0.77$ lag (1 mark), slip $\sim 7\%$ (1 mark) and efficiency $\sim 77\%$ (1 mark)	(6)
	b)	Diagram (2 marks), explanation (2 marks)	(4)
17	a)	Principle of operation (3marks), Comparison (2 marks)	(5)
	b)	Two methods of speed control with figures (2.5 marks each)	(5)
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**\*\*Question number 6 of Part A: Marks may be given if attempted since it is outside the scope of the syllabus.**  
**Methodology of attempting analytical questions may be given weightage while evaluating answer paper.**