O.P.Code: 25EE2102	R25	H.T.No.									

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)

M.Tech I Year I Semester Regular Examinations January/February-2026

MACHINE MODELLING & ANALYSIS
(Power Electronics)

Time: 3 Hours **Max. Marks: 60**

(Answer all Five Units **5 x 12 = 60** Marks)

	UNIT-I			
1	Derive the expressions for flux linkages λ1 and λ2 of two coupled coils in a linear magnetic circuit.	**CO1**	**L3**	**12M**
	OR			
2	Considering a two pole three phase Y connected salient pole synchronous machine, plot the air ga mmf waveform of as winding with the assumption that MMF(0) is zero.	**CO1**	**L3**	**12M**
	UNIT-II			
3	What is the physical significance or practical effect of applying $K_s L_s (K_s)^{-1}$ transformation to the inductance matrix?	**CO2**	**L3**	**12M**
	OR			
4	Explain the commonly used reference with necessary variables and transformation employed.	**CO2**	**L2**	**12M**
	UNIT-III			
5	Derive torque equation in machine variables for a 3-phase, wye-connected symmetrical induction machine.	**CO3**	**L3**	**12M**
	OR			
6	Obtain the arbitrary reference-frame equivalent circuits for a 3-phase, symmetrical induction machine.	**CO3**	**L4**	**12M**
	UNIT-IV			
7	Draw the equivalent circuits of a 3-phase synchronous machine with the reference frame fixed in a rotor.	**CO4**	**L2**	**12M**
	OR			
8	A 3-phase, 64-pole, hydro turbine generator is rated at 325 MVA, with 20-Kv line-to-line voltage and a power factor of 0.85. The machine parameters in ohms at 60 Hz are: r_s = 0.00234, X_q = 0.5911, and X_d = 1.0467. For a balanced, steady-state rated conditions calculate (a) E_a, (b) E'_{xfd}, and (c) T_e.	**CO4**	**L3**	**12M**
	UNIT-V			
9	Derive the voltage and torque equations in machine variables of a Permanent Magnet Brushless DC Motor.	**CO5**	**L3**	**12M**
	OR			
10	Explain the Operating principle of a Permanent Magnet Brushless DC Motor.	**CO5**	**L2**	**12M**

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