		Reg. No.									
	MANIPAL INSTITUTE OF TECHNOLOGY										
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VSPIRED BY 1.15	(A constituent unit of MAI	HE, Manipal)									

DEPARTMENT OF MECHATRONICS

VII SEMESTER B.TECH. (MECHATRONICS)

END SEMESTER EXAMINATIONS, NOV-2022

SUBJECT: MODELING OF ELECTRIC VEHICLES [MTE 4085]

(30-11-2022)

Time: 3 Hours

MAX. MARKS: 50

Q. No		Μ	СО	РО	LO	BL
1A.	Identify the type of transmission shown in Fig 1A and outline the key features in contrast to the counterpart.		1	1	1	3
	Fig 1A.					
1B.	Examine modeling approaches with suitable examples.	3	1	5	3	4
1C.	Make use of block diagram to depict ICE vehicle architectures.			1	1	3
2A.	Inspect the role of design consideration for aerodynamic drag and transmission in Electric Vehicles.			3	2	4
2 B .	Analyze the safety significance of 3Box Model of vehicle			6	2	4
2C.	List the specific requirements of chassis/Body.			2	1	4
3A.	Model the Integro-differential equation of DC excited RL circuit.			5	3	3
3B.	Identify the type of motor technology from the efficiency map as shown in Fig 3B with justification.	2	2	1	1	3

3C.	Model the PMSM Motor with relevant equivalent governing	5	3	5	3	3
	equations.					
4 A.	Compare the key advantages and disadvantages of reluctance based			1	1	4
	motors over PMSM.					
4B.	Examine the control of a 3HP, 1500RPM, separately excited DC		3	1	1	3
	Motor for EV. Motor rated voltage is 230V and field voltage of 300V.					
4C.	Inspect the vector control of Induction motor.	4	3	1	1	4
5A.	List the key roles of vehicle dynamic control as fourth element.	3	3	1	1	4
5B.	Compare the active and passive cell balancing techniques.	3	5	1	1	4
5C.	Model the Battery electrical and thermal systems.	4	5	5	3	3