

USN

--	--	--	--	--	--	--	--	--

Course Code

2	2	E	E	6	3	3
---	---	---	---	---	---	---

Sixth Semester B.E. Degree Examinations, June/July 2025

ELECTRIC VEHICLE TECHNOLOGY

Duration: 3 hrs

Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
 2. Missing data, if any, may be suitably assumed

<u>Q. No</u>	<u>Question</u>	<u>Marks</u>	<u>(RBTL:CO: PI)</u>
<u>Module-1</u>			
1.	a. With a neat block diagram explain about the series hybrid EV and discuss about the modes of operation.	10	(2 :1:2.6.2)
	b. Compare the differences between fixed gear and variable gear system in BEV configuration.	10	(3 :1: 2.6.4)
(OR)			
2.	a. With a neat block diagram explain about the parallel hybrid EV and discuss about the modes of operation.	10	(2 :1: 2.6.2)
	b. Compare the differences between in-wheel drive and outer rotor drive in BEV configuration.	10	(3 :1: 2.6.4)
<u>Module-2</u>			
3.	a. With neat sketch, explain the principle and operation of DC motor drive and obtain the relation between torque, speed, input voltage and back EMF.	10	(2 :2: 2.6.2)
	b. With a neat circuit diagram and waveform, explain construction and working of the brushless DC motor.	10	(2 :2: 2.6.2)
(OR)			
4.	a. With neat sketch, explain the principle and operation of 3- ϕ Induction motor for the electric vehicle application.	10	(2 :2: 2.6.2)
	b. With a neat circuit diagram and waveform explain the permanent magnet synchronous motor.	10	(2 :2: 2.6.2)
<u>Module-3</u>			
5.	a. With a neat circuit diagram explain the operation of single phase rectifier for the HEV applications.	10	(2 :3: 2.6.2)
	b. Explain the power control strategies for power electronic converters in EV applications.	10	(2 :3: 2.6.2)
(OR)			

- | | | | | |
|----|----|---|----|----------------|
| 6. | a. | With a neat circuit diagram explain the operation of buck converter for the HEV applications. | 10 | (2 :3: 2.6.2) |
| | b. | With a neat circuit diagram explain the operation of inverter for EV application. | 10 | (2 :3: 2.6.2) |

Module-4

- | | | | | |
|----|----|---|----|----------------|
| 7. | a. | With a neat diagram explain the Battery Management System (BMS) architecture. | 10 | (2 :4: 2.6.2) |
| | b. | Mention the list of characteristics of battery for selection and explain in detail. | 10 | (2 :4: 2.6.2) |

(OR)

- | | | | | |
|----|----|--|----|----------------|
| 8. | a. | Discuss about the thermal management of HEV power electronics circuits. | 10 | (2 :4: 2.6.2) |
| | b. | List the types of batteries used in electrical vehicle applications and explain them each. | 10 | (2 :4: 2.6.2) |

Module-5

- | | | | | |
|----|----|---|----|----------------|
| 9. | a. | Explain various charging schemes of electric vehicle. | 10 | (2 :5: 2.6.2) |
| | b. | Explain about the electric charging station infrastructure. | 10 | (2 :5: 2.6.2) |

(OR)

- | | | | | |
|-----|----|--|----|----------------|
| 10. | a. | With a neat circuit diagram explain the technology for Vehicle to Grid (V2G) operations. | 10 | (2 :5: 2.6.2) |
| | b. | With a neat circuit diagram explain the solar generation integration with electric vehicles. | 10 | (2 :5: 2.6.2) |

** ** *