

THE KAVERY ENGINEERING COLLEGE*(An Autonomous Institution)***M.E DEGREE END SEMESTER THEORY EXAMINATIONS, NOV/DEC 2025***Third Semester**Power Systems Engineering***POE2425 - Electric Vehicle Technology***Regulations - 2024**Duration : 3 Hrs**Maximum : 100 Marks***PART - A (ANSWER ALL QUESTIONS) (Marks 10*2=20)**

<i>Q.No</i>	<i>Questions</i>	<i>BTL</i>	<i>CO</i>	<i>Marks</i>
1.	Highlight the history of the hybrid electric vehicle.	L2	1	2
2.	List three major technical challenges for large-scale EV adoption.	L2	1	2
3.	Define tractive effort in electric vehicles.	L1	2	2
4.	Compare mild hybrid and full hybrid vehicle.	L2	2	2
5.	State the overall electro-chemical reaction of a lead-acid battery.	L2	3	2
6.	Give two reasons why lithium-ion batteries are preferred for EVs.	L2	3	2
7.	Define an electric drive.	L1	4	2
8.	What is the significance of a starter in motor operation?	L2	4	2
9.	Define 'gear ratio' and its role in electric vehicle drivetrains.	L1	5	2
10.	Summarize the factors that determine the rated vehicle velocity?	L2	5	2

PART - B (ANSWER ALL QUESTIONS) (Marks 5*16 = 80)

<i>Q.No</i>	<i>Questions</i>	<i>BTL</i>	<i>CO</i>	<i>Marks</i>
11.	a Explain the social and environmental importance of hybrid and electric vehicles with suitable examples.	L3	1	16
	Or			
	b Compare and contrast diesel, petrol, electric and hybrid vehicles.	L3	1	16
12.	a Summarize the different types of electric vehicles. Explain operating principle of each type with architecture sketch.	L3	2	16
	Or			
	b Draw and explain the operating modes of series and parallel hybrid electric drive train architectures and list merits and demerits of each.	L3	2	16
13.	a Explain the construction and working of Lead-acid batteries and Nickel-based batteries with neat sketch.	L3	3	16
	Or			
	b Draw and explain the equivalent-circuit model of a battery. Show how it can be used to predict dynamic behavior such as voltage drop under load.	L3	3	16

14.	a	Explain the working principle, advantages, and limitations of DC motors. Discuss their applications in electric drives.	L3	4	16
	Or				
	b	With a neat diagram, explain the operation of an inverter in an electric drive system. Discuss its role in controlling motor speed and direction.	L3	4	16
15.	a	Describe the process of motor sizing in electric vehicle design. Discuss the factors influencing motor selection and their impact on vehicle performance.	L3	5	16
	Or				
	b	Explain the concept of maximum tractive effort in electric vehicles. Discuss how it influences vehicle acceleration and the design of the powertrain.	L3	5	16