Reg. No. : | | | | | | | | | | | | |

Question Paper Code: U9379

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2024

Open elective

Civil Engineering

21UEE979 ELECTRIC AND HYBRID VEHICLES

(Common to All branches)

(Regulations 2021)

Duration: Three hours | Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 20 = 100 Marks)

1.	(a)	Compare the advantages and challenges of electric vehicles when compared to traditional internal combustion engine vehicles. Discuss the environmental and economic implications of transitioning to electric vehicles.	CO1- U	(20)
		Or		
	(b)	List and explain the essential components of an electric vehicle, including the powertrain, battery, motor, and control systems. Discuss how these components work together to achieve efficient and sustainable transportation.	CO1-U	(20)
2.	(a)	Explain the fundamental principles of batteries, including their function, structure, and basic operating principles. Discuss how batteries convert chemical energy into electrical energy.	CO2 - Ana	(20)
		Or		
	(b)	Compare the advantages and disadvantages of various battery types in terms of energy density, cycle life, cost, and environmental impact. Discuss factors influencing the selection of a specific battery type for different devices or systems.	CO2 - Ana	(20)

3.	(a)	Define motor rating and engine rating for Electric Vehicles (EVs). Discuss the specific considerations and parameters involved in determining the rating of electric motors and engines for EV applications.	CO3 - Ana	(20)
		Or		
	(b)	Provide an overview of DC machines and their applications in Electric Vehicles. Discuss the advantages and challenges of using DC machines in the propulsion systems of electric vehicles.	CO3 - Ana	(20)
4.	(a)	Discuss the importance of transmission configuration in electric vehicles. Explain the different transmission types used in electric vehicles and their impact on overall performance.	CO4 - Ana	(20)
		Or		
	(b)	Identify and explain the key components of the electric vehicle drivetrain, including motors, inverters, batteries, and controllers. Discuss the role of each component in the efficient operation of the electric drivetrain.	CO4 - Ana	(20)
5.	(a)	Define series, parallel, and series-parallel configurations in the context of hybrid electric vehicles. Discuss the unique characteristics and advantages of each type.	CO5 - App	(20)
		Or		
	(b)	Discuss the key design considerations for hybrid electric vehicles, considering factors such as energy efficiency, regenerative braking, and integration of electric and internal combustion engines.	CO5 - App	(20)