Reg. No.															

Question Paper Code	12765

M.E. / M.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2024

Second Semester

M.E. - Power Electronics and Drives

20PPEEL210 - ELECTRIC VEHICLES AND POWER MANAGEMENT

Regulations - 2020

Duration: 3 Hours | Max. Marks: 100

PART - A (10 × 2 = 20 Marks)

Answer ALL Questions

		Marks	K – Level	CO
1.	What are the types of HEVs?	2	K1	CO1
2.	Define rolling resistance.	2	K1	CO1
3.	What is the function of transmission system in EV?	2	K1	CO2
4.	List the function of gears and clutches.	2	K1	CO2
5.	What are the DC/DC converters are mostly used in HEV and in EV systems?	2	K1	CO3
6.	List the advantages of a permanent magnet machine.	2	K1	CO3
7.	Define primary and secondary batteries.	2	K1	CO4
8.	What is meant by ragone plots?	2	K1	CO4
9.	Write down the chemical reaction involved in hydrogen fuel.	2	K1	CO5
10.	What are the different types of energy storage systems used in EV?	2	K1	CO5

PART - B (5 × 13 = 65 Marks)

Answer ALL Questions

			Marks	K – Level	CO
11.	a)	Describe the Electric Motor and Engine ratings of an EV and also explain the Electric motor and IC engine torque characteristics.	13	K2	CO1
		OR			
	b)	Explain the architecture and components involved in Hybrid Electric vehicle systems.	13	K2	CO1
12.	a)	Explain the concept of plug in electric vehicle and draw the block diagram of series PHEV with its advantages and disadvantages.	13	K2	CO2
		OR			
	b)	Explain in detail about the power train components with neat diagram.	13	K2	CO2
13.	a)	Describe the four quadrant operation of DC motor drive in EV.	13	K2	CO3
		OR			
	b)	Analyze the concept of vector control operation involved in permanent magnet.	13	K3	CO3

14. a) Explain in detail about the traction batteries and its applications. *13 K2 CO4*

OR

b) Demonstrate how to calculate the Peukert coefficient. *13 K2 CO4*

15. a) Briefly explain the working of fuel cell and also write its advantages and its disadvantages. *13 K2 CO5*

OR

b) Explain in detail the concept of flywheel mechanism used in EV. *13 K2 CO5*

PART - C (1 × 15 = 15 Marks)

16. a) Explain how charging and discharging of super capacitor works. *15 K2 CO4*

OR

b) Explain in detail the Fuel cell-based electric vehicle architecture and a case study of Toyota Mirai FCEV. *15 K2 CO5*