Reg. No.											

Question Paper Code	12180

B.E. / B.Tech. - DEGREE EXAMINATIONS, NOV / DEC 2023
Seventh Semester
Electrical and Electronics Engineering
20EEPC702 - ELECTRIC VEHICLES
(Regulations 2020)

Duration: 3 Hours   Max. Marks: 100

PART - A (10 × 2 = 20 Marks)
Answer ALL Questions

		Marks, K-Level, CO
1.	List the various components of HEV drive train.	*2,K1,CO1*
2.	Define Hybridization ratio.	*2,K1,CO1*
3.	Which electrolyte is used in lead acid batteries?	*2,K1,CO2*
4.	Mention limitations of fuel cells.	*2,K2,CO2*
5.	Why cannot a series motor start on no-load?	*2,K2,CO3*
6.	How is the speed of a permanent magnet motor controlled?	*2,K1,CO3*
7.	What is the difference between series and parallel hybrid?	*2,K2,CO4*
8.	Mention any four merits of series hybrid electric drive train.	*2,K2,CO4*
9.	Define the concept of constant current charging method?	*2,K2,CO5*
10.	How does a Z - Converter differ from other commonly used converter topologies?	*2,K1,CO5*

PART - B (5 × 13 = 65 Marks)
Answer ALL Questions

11.	a)	Under what condition a pure EV can be chosen as a better option compared to hybrid vehicles considering the impact on climate change?	*13,K2,CO1*
		OR	
	b)	How hybrid electric vehicles are classified based on general definition? Explain.	*13,K2,CO1*

12.	a)	Explain in detail about thermal management of the PEM fuel cell.	*13,K2,CO2*
		OR	
	b)	Explain the basic principle of super capacitors based energy storage system in hybrid electric vehicles.	*13,K2,CO2*

13.	a)	Explain the closed loop speed control method used in DC motor drive.	*13,K2,CO3*

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create   ***12180***

b) Explain the construction and working principle of three-phase Induction motor used in EV applications. *13,K2,CO3*

14. a) Explain the control strategy of Series Hybrid drive train with flow chart. *13,K2,CO4*

OR

b) Explain the Maximum State of Charge of Peak Power Source control strategy of Parallel Hybrid drive train. *13,K2,CO4*

15. a) Discuss the efficiency considerations in detail of bidirectional DC-DC converters, especially during load variations. *13,K2,CO5*

OR

b) What considerations should be taken into account when designing a Z-converter for different battery chemistries or applications? Explain. *13,K2,CO5*

PART - C (1 × 15 = 15 Marks)

16. a) With a neat block diagram, explain the microprocessor based control of the switched reluctance motor. *15,K3,CO3*

OR

b) Explain the closed loop speed control methods of Induction motor drives used in EV. *15,K3,CO3*