13/12/2024 ELECTRICAL SEM-IV C SCHEME EHEV QP CODE: 10066003

Time: 3 Hours **Total Marks: 80**

N.B: (1) Question No. 1 is compulsory.

(2) Attempt any three from the remaining questions.

(3) Figures to the right indicate full marks.

(4) Each question is of 20 Marks

Q.1	**Attempt any 4 questions**	**Marks**
A	Define the concept of Vehicle to grid and Grid to vehicle in Electric vehicle technology.	**5**
B	What is hydridness? List the classification of HEV based on Hydridness.	**5**
C	Sketch the EV configuration and describe the various subsystem of the EV configuration.	**5**
D	List and classify the various types of DC and AC machine used in EV applications.	**5**
E	Discuss why Flywheel is called as Mechanical battery. Mention its advantages and disadvantages.	**5**

Q.2		**Marks**
A	Compare and Differentiate between the battery electric vehicle (BEV), Hybrid Electric Vehicle (HEV) and plug in hybrid Electric Vehicle (PHEV), with neat, labelled block diagrams.	**10**
B	Describe in detail all modes of operation for series-parallel hybrid vehicle.	**10**

Q.3		**Marks**
A	Explain the term rolling resistance and aerodynamic drag in vehicles and derive the expression for the total power required by the drive train.	**10**
B	Elaborate on the architecture of parallel hybrid electric drive train. List down the advantages, disadvantages and applications	**10**

Q.4		**Marks**
A	Elaborate on any one of the optimization-based energy management system of EV.	**10**
B	Explain the two-quadrant operation of chopper dc motor drive with suitable waveforms for electric vehicle.	**10**

Q.5		Marks
A	Interpret on the concept of hybridization of Energy storages, with an example.	10
B	Draw and explain the typical CAN system of a hybrid electric vehicle.	10

Q.6		Marks
A	Classify the different EV battery charging methods. Explain in brief.	10
B	State and define the key battery parameters (i) Battery capacity (ii) C rate (iii) SoC (iv) DoD (v) Specific Energy (vi) Energy Density	10
