

23/05/2025 SE ELECTRICAL SEM-IV C-SCHEME EHEV QP CODE: 10082850

(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

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|---|---|
| A Explain the general block diagram of electric vehicle. | 5 |
| B Elaborate on the concept of G2V. | 5 |
| C Explain the performance parameter of the motors used in Electric vehicle. | 5 |
| D List the importance of ultracapacitors in EV/ HEV. | 5 |
| E What is hybridness? List the classification of hybridness in HEV. | 5 |

Q.2

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|---|----|
| A Elaborate on the architecture of parallel hybrid electric drive train. List down the advantages, disadvantages and applications | 10 |
| B 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 |

Q.3

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|---|----|
| A Explain the power characteristics of motor and ICE used in EV/HEV | 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 |

Q.4

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|---|----|
| A Classify the different EV battery charging methods. Explain in brief. | 10 |
| B Derive the Peukert's equation. Give its importance. Calculate the capacity of lead Acid Battery if the charging time is 5 hrs with a current of 10 amps. The peukert constant is 1.3. | 10 |

Q.5

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|---|----|
| A Describe in detail all modes of operation for series-parallel hybrid vehicle. | 10 |
| B Classify the different types of AC motors used in EV/HEVs. Explain each in brief. | 10 |

Q.6

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|---|----|
| A Classify Energy Management Strategies. Explain Rule based energy management strategies. | 10 |
| B Explain why hybridization of energy sources is important for EV/HEV. | 10 |
