

Total No. of Questions : 8]

SEAT No. :

PE-2221

[Total No. of Pages : 2

[6584]-121

**B.E. (Electrical Engineering)**

**ELECTRICAL AND HYBRID VEHICLE**

**(2019 Pattern) (Semester - VII) (403144 B) (Elective - IV)**

*Time : 2½ Hours]*

*[Max. Marks : 70*

*Instructions to the candidates :*

- 1) Solve Q1 or Q2, Q3 or Q4, Q5 or Q6, Q.7 or Q.8.
- 2) Figures to the right indicate full marks.
- 3) Neat diagrams must be drawn wherever necessary.

- Q1)** a) List out the various types of sensors used in EV and describe how they function? [4]  
b) Write a short note on Battery swapping system. [6]  
c) Explain energy management strategies with general architecture for EV's. [8]

OR

- Q2)** a) Explain the mechanism of a fuel cell electric vehicle's drive train. [4]  
b) Draw & explain the EV Fleet Management. [6]  
c) Explain EV Subsystems and Configurations. [8]

- Q3)** a) State different drive trains configuration in HEVs and explain any one. [8]  
b) Explain the strategies used in Power Management Systems for HEV. [9]

OR

- Q4)** a) What is energy hybridization and explain operation of a hybrid energy system? [8]  
b) Explain fundamentals of Vehicle dynamics and its consideration for series HEV modeling. [9]

*P.T.O.*

- Q5)** a) State the criteria for battery selection in EV. [4]  
b) Discuss motor torque calculations for an EV. [6]  
c) Draw and explain PMSM motor control for an EV application. [8]

OR

- Q6)** a) Write a short note on CAN vehicle network. [4]  
b) Mention important considerations for Sizing the Power converter. [6]  
c) Draw and explain Induction motor control for an EV application. [8]

- Q7)** a) List Li-ion battery recycling policy and standards. [4]  
b) Explain revised guidelines and standards for charging infrastructure of Electric Vehicles. [6]  
c) What is a star labelling scheme for Li-ion packs? [7]

OR

- Q8)** a) What is start up? Mention any one EV startup in detail. [4]  
b) Write a note on FAME - II policy. [6]  
c) Explain EV tariff rate declared by government for EV charging. [7]

