

Total No. of Questions : 8]

SEAT No. :

PD4722

[Total No. of Pages : 2

[6404]-232

B.E. (Mechanical Engineering)
ELECTRICAL AND HYBRID VEHICLE
(2019 Pattern) (Semester - VIII) (Elective-VI) (402051E)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Solve Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8.
- 2) Neat diagrams must be drawn wherever necessary.
- 3) Figures to the right indicate full marks.
- 4) Use of electronic pocket calculator is allowed.
- 5) Assume suitable data if necessary.

Q1) a) Describe and illustrate the structural configuration of motor layout. [6]

b) Write a short note on (i) battery cooling, (ii) thermal control and protection, (iii) battery safety and maintenance. [12]

OR

Q2) a) Describe and illustrate the motors (prime mover) classification, construction working, and control. [10]

b) Describe and illustrate the energy storage system classification-types and packs. [8]

Q3) a) Explain power flow control in electric drive-train topologies. [9]

b) Explain the power train components and sizing calculation. [8]

OR

Q4) a) Explain with suitable equations rolling resistance, aerodynamic drag/lift, grading resistance, road resistance, acceleration resistance, total driving resistance. [9]

b) Differentiate between mechanical differential and electric differential. [8]

P.T.O.

Q5) a) What are the national/international testing/regulation/licensing/approval organizations and agencies? [9]

b) Describe and illustrate the Front/Rear Suspension systems design for varieties of electric vehicle configuration. [9]

OR

Q6) a) Describe and illustrate the body loads based on varieties of electric vehicle configurations. [9]

b) What is Retrofitting? Describe and illustrate the retrofitting of Two-wheeler vehicles. [9]

Q7) a) Describe and illustrate a typical structure of battery management system. [9]

b) What are the Requirements for Charging System? [8]

OR

Q8) a) Explain the Level 1, Level 2 and Level 3 chargers of electric vehicles. [9]

b) Explain grid voltages, frequencies, wiring, real power, apparent power, and power factor. [8]

