

Total No. of Questions : 8]

SEAT No. :

P-663

[Total No. of Pages : 2

[6004]-628

B.E. (Mechanical Engineering)

ELECTRICAL AND HYBRID VEHICLE

(2019 Pattern) (Semester - VIII) (402051E) (Elective - VI)

Time : 2½ Hour]

[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) Explain the Application of three types of Motors and their Design with Examples. **[9]**

b) Describe and Illustrate the Energy Storage System Types and Packs Classification. **[9]**

OR

Q2) a) Determine the rating of motor required for following data: **[9]**

Gross curb weight(GCW) = 150Kg

Battery rating = 30Ah

Working voltage = 72V

Efficiency of motor = 95%

Acceleration required = 0 to 60 km/hr in 10 seconds

Road gradient = 10°

Vehicle range = 150Km

b) Find out battery rating considering the given data: **[9]**

Speed = 25Km/hr max,

Motor rating = 250 Watts, 24 Volts,

Motor efficiency = 85%, to cover distance of 100km.

Assume suitable data, if necessary.

P.T.O.

- Q3)** a) Explain power flow control in electric drive-train topologies. [9]
b) Differentiate between Mechanical Differential and Electric Differential. [8]

OR

- Q4)** a) Describe and Illustrate the Effect of Rolling, Pitch & Yaw on velocity and movements. [9]
b) Describe and Illustrate the Brake System and its types. [8]

- Q5)** a) Describe and illustrate the body loads based on varieties of Electric Vehicle Configurations. [9]
b) Describe and illustrate the Aesthetics and Ergonomics consideration for varieties of electric vehicle configuration. [9]

OR

- Q6)** a) What is Retrofitting? Describe and illustrate the retrofitting of Two-wheeler vehicles. [9]
b) Explain Need of vehicle Testing. What are the National/International Testing/Regulation/Licensing/Approval Organizations and Agencies? [9]

- Q7)** a) What are the Charging Methods and the Charging Standards? [9]
b) Describe and illustrate Charger Architectures. [8]

OR

- Q8)** a) Describe and illustrate a Typical Structure of Battery Management Systems (BMS) along with its necessity. [9]
b) Write detail note on end of life management of EVs and their batteries. [8]

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