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Question Paper Code: 59372A

B.E. / B.Tech. DEGREE EXAMINATION, APRIL 2019

Open elective

Civil Engineering

15UEE972– ELECTRIC AND HYBRID VEHICLES

(Common to CSE, ECE, EIE, Mechanical, IT, Chemical)

(Regulation 2015)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (5x 20 = 100 Marks)

1. (a) Conclude that the tractive force is essential to overcome the opposing forces such as Aero Dynamic force, rolling resistance, gravitational force with neat diagrams CO1- U (20)

Or

- (b) Examine three main sources of Hybrid Electric Vehicles and compare the transmission path in a conventional Internal Combustion Engine with a Hybrid Electric Vehicle also describe in detail about the components of HEV. CO1- U (20)

2. (a) Discuss the given below battery parameters for an electric vehicle based on performance requirements. CO2- U (20)

Or

- (b) Draw and explain the performance characteristics of battery. CO2- U (20)

3. (a) Draw and explain the equivalent circuit of three phase induction motor. CO3- U (20)

Or

- (b) Explain the transition from motoring to generating action using a four quadrant drive and how the regenerative braking is achieved. CO3- U (20)

4. (a) Explain the given power train components with neat sketch.
- (i) **Electric vehicle power train.** CO4- U (10)
- (ii) **Manual and Automatic transmission.** CO4- U (10)
- Or
- (b) Sketch and explain the suitable braking method, with speed torque characteristics in which the source can absorb the electrical energy. CO4- U (20)
5. (a) Analyze the given power train sizing components for Hybrid electric vehicles . CO5- Ana (20)
- (i) Rated vehicle velocity
- (ii) Initial acceleration
- (iii) Maximum velocity
- Or
- (b) Explain about the hybrid vehicle architecture, in which only one energy converter can provide propulsion power to the wheels. CO5- Ana (20)