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P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

Eighth Semester, B.E. - Automobile Engineering

Semester End Examination; May/June - 2018

Hybrid Vehicle

Time: 3 hrs

Max. Marks: 100

Note: i) Answer **FIVE** full questions, selecting **ONE** full question from each unit.

ii) Assume suitably missing data if any.

UNIT - I

- 1 a. What is meant by calculation of road load? Explain. 8
- b. Explain grid connected hybrid vehicles and how do you predict the fuel economy? 12
- 2 a. Explain the following :
- i) Mild hybrid 12
- ii) Continuous variable transmission (CVT)
- iii) Wheel motors
- b. With help of block diagram, explain series parallel switching. 8

UNIT - II

- 3 a. Sketch and explain construction details and principle of operation of DC motor. 11
- b. Explain series wound, shunt wound and compound wound D C motors. 9
- 4 a. Sketch and explain construction detail and principle operation of AC motor. 12
- b. Briefly explain the following :
- i) Synchronous motor 8
- ii) Switched reluctance motor

UNIT - III

- 5 a. Discuss the following :
- i) Launching and boosting target 10
- ii) Braking and energy recuperation
- b. Explain the usage requirement of a vehicle for neutral idle, Grade holding and Creep. 10
- 6 a. Explain the matching of IC engine with Electric drive. 10
- b. Explain the sizing of electric motor. 10

UNIT - IV

- 7 a. Explain the constructional details of lead acid battery and explain the development of voltage in a cell 12
- b. List different types battery used in hybrid vehicles. Explain. 8

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- 8 a. Discuss the important battery parameters. 10
- b. Explain the nickel metal hybrid battery and show the advantage over the other batteries used in hybrid vehicle. 10

UNIT - V

- 9 a. How many fuel cells are there? Explain any two fuel cells. 12
- b. What are the fuel cell characteristics? Explain. 8
- 10 a. Explain the methods of storage of hydrogen. 10
- b. Discuss the following :
- i) Reformers 10
- ii) Flywheels

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