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

(An Autonomous Institution affiliated to VTU, Belgaum)

Eighth Semester, B.E. - Automobile Engineering

Semester End Examination; June/July - 2015

Hybrid Vehicles

Time: 3 hrs

Max. Marks: 100

*Note: Answer any FIVE full questions, selecting at least TWO full questions from each part.*

### PART - A

1. a. Explain the vehicle parameters considered for PNGV goals. 10
- b. What is Engine downsizing? Explain. 10
- 2 a. Explain the working principle of D.C. Motor with constructional details. 10
- b. Explain the different types of A.C. motors. 10
- 3 a. What is the function of commutator? 4
- b. Explain with neat sketches:
  - i) Induction motors 16
  - ii) Synchronous motors.
- 4 a. Explain Electric locomotive propulsion system. 10
- b. Explain with the help of block diagram suitable series – parallel hybrid architecture. 10

### PART - B

- 5 a. What is the vehicle attributes considered for Grade and Cruise targets? 10
- b. Explain series RBS and Series – Parallel RBS. 10
6. a What is matching the electric drive and I.C. Engine? Explain. 10
- b. Explain with a neat sketch Simpson type automatic Transmission System. 10
- 7 a. Explain working principle and constructional details of Lead – acid battery. 10
- b. What are the parameters considered for analysis of battery? 10
- 8 a. Explain : i) Alkaline fuel cell 10
- ii) Proton exchange membrane.
- b. Explain how the hydrogen is stored on board. 10