

Roll No.....

Total No. of Printed Pages: 1

Total No. of Questions: [09]

B. Tech EE (Semester – 7th)
ELECTRICAL AND HYBRID VEHICLES
Subject Code: BELED1712
Paper ID: [18111543]

Time: 03 Hours

Maximum Marks: 60

Instruction for candidates:

1. Section A is compulsory. It consists of 10 parts of two marks each.
2. Section B consist of 5 questions of 5 marks each. The student has to attempt any 4 questions out of it.
3. Section C consist of 3 questions of 10 marks each. The student has to attempt any 2 questions.

Section – A

(2 marks each)

Q1. Attempt the following:

- a. Define hybrid vehicles
- b. What is principle of operation of DC motor drives?
- c. How can super capacitors be used to store energy?
- d. What is energy management as referred to Hybrid vehicles?
- e. Name the components used in Electric propulsion unit.
- f. What is concept of electric traction?
- g. What is principle of operation of fuel cell?
- h. Where are switch reluctance motor drives used?
- i. Draw the schematic showing power flow control in hybrid drive train topology.
- j. What are the basic performance parameters for judging vehicle performance of conventional vehicles?

Section – B

(5 marks each)

- Q2. Derive a mathematical model to describe performance of conventional vehicles
- Q3. Compare fuel efficiency of hybrid electric drive trains with electric drive trains.
- Q4. Out of induction motor drives and permanent magnet motor drives, which offers better control possibilities? Explain the control topology.
- Q5. How effective is flywheel based energy storage? Where can it be used?
- Q6. What are the factors to be kept in mind while matching the electric machine and the internal combustion engine?

Section – C

(10 marks each)

- Q7. Give the design methodology for design of hybrid electric vehicle. What are the necessary points to be looked into while designing a hybrid electric vehicle?
- Q8. How is hybridization of different energy storage devices done? What are the advantages of doing so?
- Q9. What are the various hybrid train topologies available in market? Which one of them is most efficient? Why?