

# CBCS SCHEME

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15AU662

## Sixth Semester B.E. Degree Examination, Dec.2018/Jan.2019 Hybrid and Electric Vehicles

Time: 3 hrs.

Max. Marks: 80

*Note: Answer any FIVE full questions, choosing ONE full question from each module.*

### Module-1

- 1 a. Explain the various resistances acting on a vehicle going uphill with a neat sketch. (08 Marks)  
b. Briefly discuss the prediction of fuel economy based on emissions and BSFC. (08 Marks)

OR

- 2 a. Explain the construction and operating characteristics of a  
i) Series DC motor  
ii) Shunt DC motor. (10 Marks)  
b. With a neat sketch explain the working of a separately excited DC motor. (06 Marks)

### Module-2

- 3 a. Explain the working of a switched reluctance motors with a neat sketch. (08 Marks)  
b. List and discuss the advantages and disadvantages of Brushless DC motors. (08 Marks)

OR

- 4 Explain the following with neat sketch:  
a. Series hybrid propulsion system architecture. (08 Marks)  
b. Switchable series-parallel hybrid architecture. (08 Marks)

### Module-3

- 5 a. Explain the following:  
i) Series RBS  
ii) Parallel RBS. (10 Marks)  
b. Write a short note on Launching and Boosting. (06 Marks)

OR

- 6 a. List and discuss the types of standard driving cycles by geographical region. (08 Marks)  
b. Write a short note on:  
i) Engine downsizing  
ii) Wide open Throttle Launch. (08 Marks)

### Module-4

- 7 a. Explain the various epicyclic gear Input-Output relationships. (10 Marks)  
b. With a neat sketch, explain the driveline matching with downsized V6 and 6-speed transmission. (06 Marks)

OR

- 8 a. Explain the construction and working of a lead-acid battery. (08 Marks)  
b. Explain the following:  
i) Battery capacity  
ii) Discharge rate  
iii) State of charge  
iv) Depth of discharge. (08 Marks)

**Module-5**

- 9 a. With a neat block diagram, explain the full cell EV system. (08 Marks)  
b. Write a short note on:  
i) Direct methanol fuel cell  
ii) Phosphoric acid fuel cell. (08 Marks)

OR

- 10 a. Explain following methods of hydrogen production:  
i) Steam reforming  
ii) POX reforming. (10 Marks)  
b. Explain with a simple sketch basic structure of a fuel cell. (06 Marks)

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