CBCS SCHEME

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18EE646

Sixth Semester B.E. Degree Examination, Dec.2023/Jan.2024
Electric Vehicle Technology

Time: 3 hrs. Max. Marks: 100

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

Module-1

1 a. What is an Electric Vehicle? Explain general EV configuration with a block diagram. **(08 Marks)**

b. Explain characteristics of traction motor used for propulsion of an EV. **(06 Marks)**

c. Write short notes on energy consumption by an EV in terms of prolusion and regenerative braking. **(06 Marks)**

OR

2 a. Define hybrid electric vehicle. With a neat block diagram, explain different modes of working HEV. **(06 Marks)**

b. Explain architecture of series parallel HEV drive train with a neat diagram. **(06 Marks)**

c. Explain the detailed configuration of series HEV drive train. **(08 Marks)**

Module-2

3 a. Explain the necessity of an energy storage in an EV. **(06 Marks)**

b. Define the following battery parameters :
i) Battery capacity
ii) State of discharge
iii) State of charge
iv) Depth of discharge. **(08 Marks)**

c. With a neat diagram, explain working of lead Acid battery. **(06 Marks)**

OR

4 a. With a neat diagram, explain working principle of fuel cell. **(06 Marks)**

b. Explain working of PEM fuel cell. **(08 Marks)**

c. Write short notes on super capacitors. **(06 Marks)**

Module-3

5 a. Explain combined armature and field control of DC motor drive. **(06 Marks)**

b. Explain Jurque – slip characteristics of 3-phase induction motor. **(07 Marks)**

c. Explain chopper control method of DC motor drive with relevant waveforms. **(07 Marks)**

OR

6 a. What are the advantages and disadvantages of BLDC motor drives? **(07 Marks)**

b. Explain working of 6 pulse inverter circuit used in control of 3-phase induction motor. **(07 Marks)**

c. With a neat block diagram, explain SRM drive systems. **(06 Marks)**

Module-4

7 a. With a neat block diagram, explain typical control scheme of series HEV drive train. **(07 Marks)**

b. What are control objectives of series HEV drive train? **(05 Marks)**

c. With a neat diagram, explain SOC of PPS control strategy of series HEV dirve train. **(08 Marks)**

OR

8 a. Explain power rating design of traction motor. **(06 Marks)**

b. With a neat block diagram, explain typical control scheme of parallel HEV drive train. **(07 Marks)**

c. Explain thermostat control strategy of series HEV drive train. **(07 Marks)**

Module-5

9 a. Explain the following battery charging methods :

i) Constant current charge

ii) Float charge. **(10 Marks)**

b. Explain dv/dT method of baitary termination methods. **(05 Marks)**

c. Explain non isolated grid tied Z converter circuit. **(05 Marks)**

OR

10 a. Explain with neat circuit diagram high frequency transformer based isolated charger topology. **(07 Marks)**

b. Explain with neat circuit diagram transformer less topology of charger. **(07 Marks)**

c. With a neat diagram, explain isolated bidirectional DC–DC converter. **(06 Marks)**

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