

58

Reg. No. :

Question Paper Code : 11255

M.E./M.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2023.

Second Semester

Embedded System Technologies

PX 4291 – ELECTRIC VEHICLES AND POWER MANAGEMENT

(Common to : M.E. Power Electronics and Drives/M.E. Power Systems Engineering)

(Regulations 2021)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. List the types of EV system.
2. Identify the different factors which affect the movement of vehicle.
3. Compare HEV and PHEV.
4. Organize the building blocks of automobile power train system.
5. State the advantages of PMSM drive.
6. Why SRM called singly excited and doubly salient?
7. List the types of batteries are used in the storage system.
8. List the charging methods of the electric vehicle.
9. List the types of fuel cell that use methanol.
10. What is Ultracapacitor?

PART B — (5 × 13 = 65 marks)

11. (a) With the help of a neat block diagram explain the different subsystem of electric vehicle. Also illustrate different configurations of electric vehicle. (13)

Or

- (b) (i) Compare Electric vehicle engine and Internal combustion engine vehicles. (6)
- (ii) Explain the fundamentals of vehicle mechanics. (7)

12. (a) Construct the concept of power train system of a vehicle with neat sketch also to derive the expression for vehicle speed. (13)

Or

- (b) What are the parameters affect the braking performance of the vehicle. Deliver the feature of the any one performance factor with required dynamic equation. (13)

13. (a) Explain the multi-quadrant control of DC motor with suitable chopper circuit diagram. (13)

Or

- (b) With necessary diagram Examine the regenerative braking control of SRM for low and highspeed operation. (13)

14. (a) (i) Why Lithium-ion battery is used in EV? Explain the storage technology with neat sketch. (6)
- (ii) Explain the different modes of charging a battery compare them in detail. (7)

Or

- (b) With necessary diagram explain each part of the Tesla Roadster electric vehicle. (13)

60

15. (a) Explain the fuel cell energy production technology in electric vehicle with neat sketch. (13)

Or

- (b) Explain different methods for storage of hydrogen on-board. (13)

PART C — (1 × 15 = 15 marks)

16. (a) Develop the expression for the gear ratio of each gear from manual gear transmission. (15)

Or

- (b) Explain the battery and ultracapacitor as energy source elements in electric vehicle. (15)

binils.com