USN | | | | | | | | | | **18AU754**

Seventh Semester B.E. Degree Examination, Dec.2023/Jan.2024
Introduction to Electric Vehicles

Time: 3 hrs.   Max. Marks: 100

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

Module-1

1   a. Briefly explain the need of electric drive.   **(10 Marks)**
   b. Explain briefly the past 30 years development of electric vehicle.   **(10 Marks)**

OR

2   a. Briefly explain the historical development of electric vehicles.   **(10 Marks)**
   b. Write the engineering philosophy of electric vehicles.   **(10 Marks)**

Module-2

3   a. Explain the following components of an electric vehicle circuit and mention their functions :
     i) Conductors   ii) Insulators   iii) Solenoids   iv) Capacitors.   **(10 Marks)**
   b. With a neat sketch, explain the AC and DC motors.   **(10 Marks)**

OR

4   a. Describe the weight and size parameters of electric vehicles.   **(10 Marks)**
   b. Briefly explain the energy parameters, performance parameters.   **(10 Marks)**

Module-3

5   a. Explain briefly the advantages and disadvantages of Battery Operated Electric Vehicle (BOEV).   **(10 Marks)**
   b. Using suitable block diagram, explain the major components of a Battery Operated Electric Vehicle.   **(10 Marks)**

OR

6   a. Explain briefly the controller and inverter.   **(10 Marks)**
   b. With a neat diagram, explain the regenerative braking.   **(10 Marks)**

Module-4

7   a. Sketch and explain the any two types of batteries.   **(10 Marks)**
   b. List out the different types of batteries used in the electric vehicles.   **(10 Marks)**

OR

8   a. With a neat diagram, explain the basic component of the battery.   **(10 Marks)**
   b. Define the following battery parameters : i) Battery capacity   ii) Discharge rate
     iii) State of discharge   iv) State of charge   v) Depth of discharge.   **(10 Marks)**

Module-5

9   a. With a neat sketch of the basic structure of a fuel cell explain its working.   **(10 Marks)**
   b. Write a brief account of fuel cell characteristics.   **(10 Marks)**

OR

10   a. Sketch and explain the proton exchange membrane.   **(10 Marks)**
   b. Briefly explain the hydrogen storage systems.   **(10 Marks)**

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.