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BTECH
(SEM IV) THEORY EXAMINATION 2023-24
ELECTRIC AND HYBRID VEHICLES

TIME: 3 HRS

M.MARKS: 70

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. **Attempt all questions in brief.** **2 x 7 = 14**

a.	What is the definition of an automobile?
b.	What are the main differences between the body and chassis of an automobile?
c.	What are electric vehicles, and how do they differ from traditional internal combustion engine vehicles?
d.	What are hybrid vehicles, and how do they combine different power sources?
e.	What are the key types of electric components used in hybrid and electric vehicles?
f.	What is the role of a controller in hybrid and electric vehicles?
g.	What are the different types of EV chargers available in the market?

SECTION B

2. **Attempt any three of the following:** **7 x 3 = 21**

a.	Describe the primary functions of an automobile chassis.
b.	Describe the main types of hybrid vehicles.
c.	How do DC Motor drives differ from other motor drive configurations?
d.	Describe the working principle of a basic vehicle controller.
e.	Explain the working principle of a Level 1 EV charger.

SECTION C

3. **Attempt any one part of the following:** **7 x 1 = 7**

(a)	What is the basic layout of a typical four-wheeler automobile?
(b)	Explain the significance of front-engine and rear-engine layouts in automobiles.

4. **Attempt any one part of the following:** **7 x 1 = 7**

(a)	What are the primary advantages of electric vehicles over conventional vehicles?
(b)	Discuss the main disadvantages of electric vehicles.

5. **Attempt any one part of the following:** **7 x 1 = 7**

(a)	How do Induction Motor drives achieve high efficiency in electric vehicles?
(b)	What are the advantages of using Permanent Magnet Motor drives in electric vehicles?

6. **Attempt any one part of the following:** **7 x 1 = 7**

(a)	What are the main energy storage requirements for hybrid and electric vehicles?
(b)	What is a super capacitor, and how does it differ from a traditional battery?

7. **Attempt any one part of the following:** **7 x 1 = 7**

(a)	What factors influence the charging time of an electric vehicle?
(b)	Discuss the importance of a business plan for an electric vehicle startup.