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B.TECH
(SEM VIII) THEORY EXAMINATION 2022-23
ELECTRIC VEHICLES

Time: 3 Hours ***Total Marks: 100***

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

SECTION A

1. Attempt *all* questions in brief. 2 x 10 = 20

(a) Mention the importance of electric vehicles.
(b) What are the challenges involved in using electric vehicles?
(c) Define electromechanical batteries.
(d) List any four applications of the fuel cells?
(e) Mention the methods for starting an induction motor?
(f) What is a permanent magnet motor used for?
(g) Explain the Fleming's left hand rule.
(h) What are hybrid vehicles?
(i) List out the various components removed from IC engine vehicle while changing it into electric vehicles.
(j) What is the function of gearbox in a vehicle?

SECTION B

2. Attempt any *three* of the following: 10x3=30

(a) Explain the various components of EVs in details.
(b) Explain lead-acid battery schematic and physical structure also enumerates its advantages and limitations.
(c) Explain compound wound DC motors with neat circuit diagram and also write the voltage and current equations.
(d) Explain the various design consideration of Charging system ,Also enumerate various Charging methods.
(e) Give a brief note on Identification of EV demand and explain the Impact of EV charging on power grid.

SECTION C

3. Attempt any *one* part of the following: 10x1=10

(a) Compare petrol and electric vehicle with their merits and demerits.
(b) Explain historical development of automobile and Remembering development of interest and activity in the EV from 1890 to present day

4. Attempt any *one* part of the following: 10x1=10

(a) Discuss about fuel cell characteristics and types. Explain the working principle of a fuel-cell and its analysis.
(b) Explain different charging algorithm and discharging method for battery pack.

5. Attempt any *one* part of the following: 10x1=10

(a) Explain the working and construction of DC-DC converter. What are the uses of DC-DC converter?
(b) Explain construction and working principle of three-phase Induction motor.

6. Attempt any *one* part of the following: 10x1=10

(a) Discuss about On-board/Off-board chargers. What are the needs of a charging system?
(b) Write a short notes on
  (i) IEC60950,
  (ii) IEC62196 key highlights

7. Attempt any *one* part of the following: 10x1=10

(a) Give an overview and applicability of AI for the EV ecosystem. What is the future of AI in EVs?
(b) Explain different power sources. What is centralized charging schemes? Write its merits.