Paper id: 251031

Subject Code: BEE064

Roll No: | | | | | | | | | | | | | |

BTECH
(SEM VI) THEORY EXAMINATION 2024-25
ELECTRICAL AND HYBRID VEHICLES

TIME: 3 HRS **M.MARKS: 70**

Note: Attempt all Sections. In case of any missing data, choose suitably.

SECTION A

1. Attempt *all* questions in brief. **02 x 7 = 14**

Q no.	Question	CO	Level
a.	Define the term State of Charge (SoC) in battery systems.	CO3	K2
b.	Mention any two differences between DC motor and Switch Reluctance motor in EVs.	CO2	K1
c.	List any four environmental benefits of electric vehicles.	CO1	K1
d.	Define the State of Health (SoH) in the context of battery performance monitoring.	CO3	K2
e.	Give two examples of energy management strategies used in Hybrid Electric Vehicles (HEVs).	CO4	K3
f.	Name two driving cycles are commonly used for EV performance evaluation.	CO1	K2
g.	What is power split hybrid architecture?	CO2	K2

SECTION B

2. Attempt any *three* of the following: **07 x 3 = 21**

a.	Explain the flywheel-based energy storage and its analysis.	CO2	K4
b.	Discuss the comparison of Lithium-ion and Lead-acid batteries for EV use.	CO3	K3
c.	Explain the basic configuration of a Battery Electric Vehicle (BEV).	CO1	K3
d.	What are the challenges in implementing energy management strategies?	CO4	K4
e.	Analyze the working and control scheme of an Induction Motor in EVs.	CO2	K4

SECTION C

3. Attempt any *one* part of the following: **07 x 1 = 07**

a.	Explain mathematical modeling of vehicle performance considering tractive forces.	CO2	K5
b.	Discuss the environmental and societal importance of electric vehicles.	CO1	K3

4. Attempt any *one* part of the following: **07 x 1 = 07**

a.	Describe different types of electric drive-train topologies and their efficiency.	CO2	K5
b.	Analyze the configuration and control of Permanent Magnet Synchronous Motor drives in EVs.	CO2	K4

5. Attempt any *one* part of the following: **07 x 1 = 07**

a.	Write short notes on hybrid energy storage using battery and ultra capacitor.	CO3	K4
b.	Explain the function and structure of a typical Battery Management System in detail.	CO3	K3

6. Attempt any *one* part of the following: **07 x 1 = 07**

a.	Classify different energy management strategies used in hybrid EVs.	CO4	K4
b.	Compare rule-based and optimization-based Energy Management System (EMS) in HEVs.	CO4	K5

7. Attempt any *one* part of the following: **07 x 1 = 07**

a.	Discuss the configuration and working of a DC motor drive used in electric propulsion.	CO2	K4
b.	Evaluate the role of communication protocols in vehicle power train control.	CO4	K5