



Paper id: 251001

Printed Page: 1 of 1  
Subject Code: BAU602

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**BTECH**  
**(SEM VI) THEORY EXAMINATION 2024-25**  
**ELECTRIC & HYBRID VEHICLES TECHNOLOGY**

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 Hybrid Electric Vehicle (HEV).	1	K1
b.	List different configurations of electric vehicles.	1	K1
c.	What are the performance parameters of an electric vehicle?	2	K1
d.	State any two advantages of regenerative braking.	2	K1
e.	What is a Permanent Magnet Motor Drive?	3	K1
f.	Mention any two factors considered while sizing EV components.	4	K1
g.	What are ultra-capacitors? Mention one application.	5	K1

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

a.	Explain different types of hybrid configurations: Series, Parallel, and Series-Parallel.	1	K1,K2
b.	Describe the basics of vehicle power source characterization with examples.	2	K1,K2
c.	Discuss the configuration and control of Switch Reluctance Motor drives.	3	K1,K2
d.	Write a note on selection criteria for energy storage systems in EVs.	4	K1,K2
e.	Explain the working principle of fuel cells with a neat sketch.	5	K1,K2

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

a.	Discuss the construction and working of a Plug-in Hybrid Electric Vehicle (PHEV).	1	K1,K2
b.	Compare BEV, HEV, and FCEV with respect to energy source and emissions.	1	K1,K2

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

a.	Derive the mathematical model for vehicle acceleration performance.	2	K2,K3
b.	Explain power flow control in hybrid drivetrains with a suitable block diagram.	2	K1,K2

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

a.	Illustrate the control strategy for DC motor drives in EVs.	3	K1,K2
b.	Compare and contrast Induction Motor and Permanent Magnet Motor Drives.	3	K1,K2

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

a.	Describe the procedure for sizing propulsion motors in EV applications.	4	K1,K2
b.	Explain the criteria for matching electric machines with ICE in HEVs.	4	K1,K2

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

a.	Discuss the principle and applications of ultra-high-speed flywheel-based energy storage.	5	K1,K2
b.	Compare different types of batteries used in EVs based on efficiency, cost, and lifecycle.	5	K1,K2