CBCS SCHEME - Make-Up Exam

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BAU613A

Sixth Semester B.E/B.Tech. Degree Examination, June/July 2025
Hybrid Vehicle Technology

Time: 3 hrs. Max. Marks:100

Note: *1. Answer any FIVE full questions, choosing ONE full question from each module.*
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
1	a.	Elaborate the social and environmental importance of hybrid and Electric Vehicles.	10	L4	CO1
	b.	With a block diagram, explain the working of Hybrid Electric Vehicle.	10	L2	CO1
		OR			
2	a.	With equation analyze the Hybrid Electric Vehicle model.	10	L3	CO1
	b.	A battery electric vehicle weighs 1000 kgs and has a battery capacity of 20 KWH. Frontal projected area is $3m^2$. Motor power = 40 kW and Torque is 100 Nm at high speeds and peak torque is 140 NM at low speeds. Wheel specifications is 185/70R14. Gear ratio is 4 air density = 1.2 kg/m^3. Assume any missing data suitably. i) Find the air drag if coefficient of air drag is 0.4 at 40 kmph ii) Find the theoretical range on a flat road for 40 kmph constant speed iii) Find the theoretical maximum speed on a level road.	10	L4	CO1
		Module – 2			
3	a.	With a schematic diagram demonstrate the working of micro hybrid electric vehicles.	10	L3	CO2
	b.	With a schematic diagram, show how series-parallel hybrid architecture combines the benefit of both series and hybrid electric vehicles.	10	L3	CO1
		OR			
4	a.	How can active noise control be applied to reduce noise in hybrid electric vehicles?	10	L1	CO2
	b.	How do electric vehicles regenerate energy during braking? Elaborate why only a small amount of energy can be regenerated.	10	L1	CO2
		Module – 3			
5	a.	Explain the working of an induction motor with neat sketch.	10	L1	CO2
	b.	Show the construction and working of a BLDC motor. Mention their advantages and limitations.	10	L4	CO2

		OR			
6	a.	Demonstrate the constructions working of doubly salient permanent magnet motor drives.	10	L4	CO2
	b.	Explain the concept of design and sizing of traction motors for HEV.	10	L2	CO2
		Module – 4			
7	a.	What are characteristics of batteries? Explain in detail.	10	L2	CO3
	b.	Explain ultra capacitor in detail and how this can be used in EV.	10	L2	CO3
		OR			
8	a.	With a neat sketch, explain the working of proton exchange membrane type of fuel cell.	10	L2	CO3
	b.	Describe the characteristics of fuel cell.	10	L2	CO3
		Module – 5			
9	a.	Elaborate the matching the electric machine and internal combustion engine to power a hybrid vehicle.	10	L3	CO4
	b.	Explain the functions of power electronic derives used in hybrid vehicles and typical power losses in each of these components.	10	L2	CO4
		OR			
10	a.	Classify different energy management strategies, explain any two.	10	L2	CO4
	b.	Discuss the implementation issues of energy management strategies.	10	L3	CO4

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