Register Number:……..

KUMARAGURU
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B.E/B.TECH DEGREE EXAMINATIONS: APRIL /MAY 2024

(Regulation 2018)

Sixth Semester

ELECTRICAL AND ELECTRONICS ENGINEERING

U18EEE0013: Electric Vehicle Technology

COURSE OUTCOMES

CO1: Gain the knowledge on the fundamentals and benefits of Electric vehicles.

CO2: Understand the performance of various subsystems in Electric vehicles.

CO3: Analyze the choice of Electric motor drive technologies used in Electric vehicles.

CO4: Compare and select the appropriate energy source for Electric vehicles.

CO5: Acquire the concepts of grid connected technologies.

Time: Three Hours **Maximum Marks: 100**

Answer all the Questions:-
PART A (10 x 2 = 20 Marks)
(Answer not more than 40 words)

1.	What are all the hurdles faced by electric vehicle manufacturers and stakeholders in India?	CO1	[K_2]
2.	Classify electric vehicles based on their power sources.	CO1	[K_1]
3.	Define rolling resistance in vehicle dynamics.	CO2	[K_1]
4.	Which electric motor is most preferable for EVs, and why?	CO3	[K_2]
5.	Write the dynamic equation in vehicle dynamics, and what variables does it relate?	CO2	[K_1]
6.	Name the various charging technologies used for Electric Vehicle (EV) batteries.	CO4	[K_1]
7.	Define State of Charge (SoC) along with its formula.	CO4	[K_1]
8.	Which electric vehicle charging standard commonly used worldwide?	CO5	[K_2]
9.	List out the various power converters electrifying EVs?	CO3	[K_1]
10.	What is V2G?	CO5	[K_1]

Answer any FIVE Questions:-
PART B (5 x 16 = 80 Marks)
(Answer not more than 400 words)

11.	a)	Explain the essential components of an electric vehicle and their functions in enabling its operation.	10	CO1	[K_2]
	b)	Compare EVs with traditional internal combustion engine vehicles.	06	CO1	[K_2]
12.		Discuss the principles of operation and key design features of Permanent Magnet BLDC motor drives, highlighting their advantages and limitations in Electric Vehicle propulsion systems.	16	CO3	[K_2]
13.		Explain the role of a Battery Management System (BMS) in Electric Vehicles. Discuss the key functions performed by the BMS and its importance in ensuring battery safety, longevity, and performance.	16	CO4	[K_2]
14.	a)	Explain the concept of aerodynamic drag and its impact on vehicle efficiency.	10	CO2	[K_2]
	b)	Derive the equation for the tractive effort required by an EV.	06	CO2	[K_2]
15.		Analyze the components required for setting up an electric vehicle charging station, detailing their functions and importance.	16	CO5	[K_2]
16.	a)	Compare the advantages and disadvantages of different Electric Vehicle battery chemistries, including lithium-ion, nickel-metal hydride, and lead-acid.	08	CO4	[K_2]
	b)	Discuss the challenges, and opportunities for EV adoption in the country.	08	CO1	[K_2]

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