



Paper ID : 250130

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Subject Code: KOE090

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BTECH
(SEM VIII) THEORY EXAMINATION 2024-25
ELECTRIC VEHICLES

TIME: 3 HRS

M.MARKS: 100

Note: Attempt all Sections. In case of any missing data; choose suitably.**SECTION A****1. Attempt all questions in brief.****2 x 10 = 20**

Q No.	Question	BL	CO
a.	A modern-day EV has a battery pack of 50kWh. Calculate the charger capacity in kW to charge the vehicle at home in 10 hours completely.	K4	1
b.	Write the full form of FAME and EMPS in reference to FAME II and EMPS 2024 schemes of the Government of India?	K1	1
c.	Write the type of motors that are predominantly used in electric three-wheelers in India?	K1	2
d.	Enlist the three types of motors used in Modern Electric Cars.	K1	2
e.	Explain the objectives of BMS.	K2	3
f.	Define SoC and C (i.e. C50) Rating of a battery.	K2	3
g.	Explain the billing systems for EV charging work?	K2	4
h.	Enumerate the major power quality problem that must be addressed while designing a fast EV Charger.	K2	4
i.	What is a fuel cell? Comment on its efficiency.	K1	5
j.	Define DoD.	K1	3

SECTION B**2. Attempt any three of the following:****10 x 3 = 30**

Q No.	Question	BL1	CO
a.	Compare the electric vehicles with conventional IC engines. Comment on the source-to-wheel efficiency of both.	K2	1
b.	Critically compare the BLDC, PMSM, and Induction Motor used in EV.	K5	2
c.	Write a Short Note on the Following. (a) Cell Balancing. (b) UN38 Regulations.	K1	3
d.	Discuss On-board/Off-board chargers. What are the needs of a charging system?	K2	4
e.	Explain about V2V and V2G technology.	K2	5

SECTION C**3. Attempt any one part of the following:****10 x 1 = 10**

Q No.	Question	BL	CO
a.	Explain the architecture of EV and its basic components using suitable schematics.	K2	1
b.	Briefly discuss the historical developments of electric vehicles based on different generations of EV.	K2	1



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4. Attempt any *one* part of the following:

10 x 1 = 10

Q No.	Question	BL	CO
a.	Explain the operation of DC to DC converter to control the speed of DC motors. Draw the suitable waveforms and Circuit diagrams.	K2	2
b.	Explain the working principle of an axial flux motor along with its construction details.	K2	2

5. Attempt any *one* part of the following:

10 x 1 = 10

Q No.	Question	BL1	CO
a.	Explain the various types, design, and operation of lithium batteries.	K2	3
b.	List the factors to be considered while selecting a battery for EV. How do these factors affect the selection of battery?	K4	3

6. Attempt any *one* part of the following:

10 x 1 = 10

Q No.	Question	BL	CO
a.	What do you understand by OCPP and OCPI? Explain in detail.	K2	4
b.	Draw and explain the block diagrams and subsystems of low and high power charging.	K2	4

7. Attempt any *one* part of the following:

10 x 1 = 10

Q No.	Question	BL	CO
a.	Explain the centralized charging scheme used for EV charging.	K2	5
b.	Give an overview and applicability of AI for the EV ecosystem. How AI can be used for EV demand management in the grid.	K5	5