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Bengaluru

Mid Term Examinations - October 2026

Date: 06/10/2026 **Time:** 09:30 AM - 11:00 AM

Course Code: EEE3103 **Course Name:** Electric Vehicles and Battery technology

Semester: Seventh Semester **Max. Marks:** 50 **Weightage:** 50%

CO - Levels	CO1	CO2
Marks	46	44

PART A: Answer Following Questions. 10 M

Q.N.	Questions	M	CO	BT
1	**Apply the EV history to identify two reasons for the disappearance of electric vehicles in the early 1900s.**	2	CO1	BT3
2	**Illustrate the relationship between wheel torque and tractive effort.**	2	CO1	BT3
3	**Apply vehicle-dynamics concepts to identify the three basic performance parameters of an electric vehicle.**	2	CO1	BT3
4	**Illustrate the definition of a hybrid vehicle in terms of energy sources and energy converters.**	2	CO2	BT3
5	**Apply the series-hybrid operating modes to identify the mode in which the engine-generator charges the battery at low vehicle load.**	2	CO2	BT3

PART B : Answer Any 1 Following Questions. 10 M

Q.N.	Questions	M	CO	BT
6	**Illustrate the six possible BEV configurations presented in the module and state the distinguishing feature of each configuration.**	10	CO1	BT3
7	**An electric vehicle of mass 1400 kg moves on a 10° uphill road with a tractive effort of 4200 N. The rolling resistance is 220 N and aerodynamic drag is 180 N. Determine the acceleration. Take g = 9.81 m/s².**	10	CO1	BT3

PART C: Answer Any 1 Following Questions. 10 M

Q.N.	Questions	M	CO	BT
8	**A vehicle requires a tractive effort of 2800 N while travelling at 15 m/s. If the overall propulsion and drivetrain efficiency is 0.85, determine the traction power at the wheels and the battery power required.**	10	CO1	BT3
9	**An EV travels 120 km with a battery energy consumption of 18 kWh. Determine the energy consumption in Wh/km. If the usable battery energy is 42 kWh, determine the corresponding theoretical driving range at the same consumption.**	10	CO1	BT3

PART D: Answer Any 1 Following Questions. 10 M

Q.N.	Questions	M	CO	BT

10	**A series hybrid electric vehicle requires 20 kW at low load while the engine-generator produces 28 kW. Determine the battery charging power and identify the operating mode.**	10	CO2	BT3
11	**During acceleration, a parallel hybrid electric vehicle requires 65 kW. The engine supplies 40 kW. Determine the motor power and identify the operating mode.**	10	CO2	BT3

PART E: Answer Any 1 Following Questions. 10 M				
Q.N.	**Questions**	**M**	**CO**	**BT**
12	**Illustrate the configuration and operating modes of a series hybrid electric drive train. Include pure electric, hybrid, engine traction and regenerative-braking modes.**	10	CO2	BT3
13	**Illustrate the configurations and operating modes of a parallel hybrid electric drive train, including engine-only, electric-only, hybrid, regenerative-braking and light-load charging modes.**	10	CO2	BT3