

SECTION-D

Note: Long answer questions. Attempt any two questions out of three Questions. **(2x8=16)**

- Q.23 Draw the schematic of general configuration of electrical subsystems of an Electric Vehicle (EV) and a Hybrid Electric Vehicle (HEV).
- Q.24 Define the analysis & modelling of electric Vehicle.
- Q.25 Explain on board chargers in detail.

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4th Sem.

Branch : Instrumentation & Control
Sub. : Electric Vehicles

Time : 3 Hrs.

M.M. : 60

SECTION-A

Note: Multiple type Questions. All Questions are compulsory. **(6x1=6)**

- Q.1 In a hybrid electric vehicle one energy source is _____ & the other is a conversion of a _____.
a) Combustion, energy to fuel
b) Storage, energy to fuel
c) Storage, energy to energy
d) Storage, Fuel to energy
- Q.2 A traction inverter is a power electronic device that is used in electric and hybrid vehicles to convert the _____.
a) DC to AC b) AC to DC
c) DC to DC d) AC to AC
- Q.3 Lead Acid batteries are ____ and thus, considered as ____ batteries.
a) Rechargeable, secondary
b) Not rechargeable primary
c) Rechargeable primary
d) Not Rechargeable, Secondary

- Q.4 Fuel Cell use combination of
 a) Zinc + Sulphur b) Sulphur + Oxygen
 c) Hydrogen + Oxygen d) Sodium + Sulphur
- Q.5 Battery that cannot be charged again is called
 a) Primary Battery
 b) Secondary Battery
 c) Both primary and secondary
 d) Neither Primary Nor Secondary
- Q.6 In series hybrid vehicle _____ is coupled with the Internal combustion Engine to produce electricity for propulsion.
 a) Diesel engine b) Gas engine
 c) Hydrogen engine d) Generator

SECTION-B

Note: Objective/Completion type questions. All questions are compulsory. (6x1=6)

- Q.7 What is the unit of charge capacity in a battery.
- Q.8 _____ Vehicles are powered by battery only.
- Q.9 Electric vehicles produce zero Tailpipe Emissions. (True/False)
- Q.10 What the full form of PHEV.

- Q.11 Battery that cannot be charged again is called _____.
 Q.12 What are the Key components of a Hybrid Electric Vehicle?

SECTION-C

Note: Short answer type Questions. Attempt any eight questions out of ten Questions. (8x4=32)

- Q.13 What are the basic component of Fuel Cell Electric Vehicle.
- Q.14 Explain energy management system in short.
- Q.15 What do you mean by the super capacitors used in EV.
- Q.16 Write the short note on Traction Inverter.
- Q.17 What are the Social & Environmental importance of Hybrid and Electric Vehicles.
- Q.18 Write the causes of battery Explosion in Electric Vehicles.
- Q.19 What is state of charge (SOC) in battery?
- Q.20 Write the short notes on AC chargers, DC chargers.
- Q.21 What are the basics of Micro, Mild and Mini EV.
- Q.22 What are the design and control of switched mode power converters?