

## ISEP Exam – 05 november 2024

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Please, fill this document.

Name :

First name:

*Question 1 :* Give one reason why electric cars begin to democratize nowadays

*Question 2 :* Give the three main components of an electric car

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*Question 3 :* Why is it important to have a 12V battery in an electric or hybrid car in addition with the HV battery ?

*Question 4 :* List the four architectures of a hybrid vehicle

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*Question 5 :* How it's called the « brain » of an electric or hybrid vehicle ?

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*Question 6 :* Give the equation of the usable power  $P$  (W) in function of current and voltage

*Question 7 :* What is the open voltage of a lead acid cell ? and give the total voltage of what we call a « 12V battery » ?

*Question 8 :* Why Lithium-ion is the main technology used for propulsion in HEV today ?

*Question 9 :* Define a supercapacitor (when it's used, its role)

*Question 10 :* What is a SOC for a battery ? What can we compare it ?

*Question 11 :* Give the main role of a Battery Management System

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*Question 12 :* Give two safety rules when you use a battery

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*Question 13 :* In which range of power, fuel cell electric vehicles are used ?

*Question 14 :* How it's called a converter which converts a DC to AC signal ?

*Question 15 :* Define a bidirectional converter and why we use it in a HEV with energy recovery system when braking ?

*Question 16 :* List the two main electric motors used in a HEV

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*Question 17 :* What is more efficient between hydraulic brake and electric one ?

*Question 18 :* Explain how battery is recharged using induction technology

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*Question 19 :* List the name of two vehicles (one electric and one hybrid)

- Electric :
- Hybrid :

*Question 20 :* What do you think about the future of HEV ?