EE512 - Electric Vehicles - test 2 – 2024/11/18

Before starting, FOLD the A3 paper to become a 2-page A4 paper

NAME (surname first): _____

Student Number: _____

Signature: _____

Name of student sitting on your right: _____

Name of student sitting on your left: _____

MARKS WILL BE DEDUCTED, if the answer is too long.

ANSWER ALL QUESTIONS on this paper.   Marks: 20% each. Total: 100%

Report Hotline -   Wechat ID: norbert_mainland

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All reports, if found real, will be generously rewarded (with extra marks).

Question 1 – Power Source

Complete the table below:

Power Source Type	What is the best feature or characteristics of this type of battery?	How is this feature used in EV?
Ultra Capacitor		
Metal-Air Battery		
Fly-Wheel		
Fuel Cells		
Lithium based battery		

Question 2 – Auxiliary Unit

(a)   During the charging of Ni-MH batteries, what are the THREE indicators that the battery is fully charged, and you should stop charging?

Indicator 1:

Indicator 2:

Indicator 3:

(b)   TWO MAJOR ADVANTAGES <u>fully electric power steering</u> has, over <u>electro hydraulic power steering</u>.

Advantage 1:

Advantage 2:

Question 3 – EV Infrastructure

Do you think Battery Swapping is common among future EVs?

(a)   Two major advantages of battery swapping.

Advantage 1:

Advantage 2:

(b)   Two major disadvantages of battery swapping

Disadvantage 1:

Disadvantage 2

(c)   What type(s) of electric vehicles are most suitable for battery swapping?

Vehicle Types:

Question 4 – Energy and the Environment

What are the 5 types of harmful things ICE vehicles have emitted, that is absent in EVs? How do these harmful substances/effects affect our daily lives?

Harmful 1:

Harmful 2:

Harmful 3:

Harmful 4:

Harmful 5:

Question 5 – Electric Motor

(a)   Draw the cross-section of a typical Flux Switching Permanent Magnet (FSPM) Motor. (10 marks)

(b)   Draw another diagram to explain how flus switching works. Briefly explain your diagram. (10 marks)

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