# Assignment on Battery management System (BMS)

Q1. What is a BMS ? Type of BMS & differentiate the types of BMS.

Ans. i) Battery management system manages a battery pack by protecting the battery from operating outside its safe operating zone by monitoring state controlling its environment & balancing the lithium-iron cells insides the battery pack.

ii) Type of B.M.S

Theire is two type B.M.S in EV system.

a) Hardware BMS b) Software BMS

iii) Different between hardware BMS & Software B.M.S

| Hardware B.M.S | Software B.M.S |
|---|---|
| i) The sensor system consists of different sensor to monitor & measure battery parameters including cell voltage battery temp & battery current. | i) The software of the B.M.S is the center of the whole system because it controls all hardware operation & analyses of sensor data for making decisions & state estimations. switch control sample rate monitoring in the sensor system, |
| ii) A variable resistor may be necessary to help balance cell or perform internal resistance measurements. | ii) most soft faults will be discovered through online data processing. An intelligent data analysis is required in order to provide battery fault warning & indicate 'out-of-tolerance condition. |
| iii) Current, voltage & temperature should be measured to improve the capability of state tracking in real life application. | |

Q.2 What are the technical parameter to keep in mind while procuring a BMS for assembling a battery pack?

→ When procuring battery pack most fuction considering

i) overvoltage cut-off -

overvoltage cut-off is maximum voltage of cell to which a cell should be charge. The overvoltage cut-off for LFP cell is 3.6 V & NMC cell is 4.2 V cell in a battery pack must be use a BMS that cut-off the cell once they charged to this ~~volts~~ Vtg.

ii) undervoltage - cut-off -

undervoltage cut off is the Vtg at which cell need to stop discharging any further under voltage cut off. for LFP cell is 2.5 V & for NMC cell is 2.75 V But highly discourage touching till that point. Prefer an earlier cut-off multiple cycles of discharging can lead to battery swelling.

iii) Continuous current -

It is the parameter setting. in a BMS that make sure the BMS is fuebionaming in all aspects when operated at a particular charged discharge current.

iv) over voltage detection (OCD) -

It is max'm current the B.M.S can allow for a very short period of time. for. 14s, 50cc. BMS can allow 100A, OCD for one sec. The battery will cut-off after one second of achieving OCD. This cut-off is done in case of controller in electric vehicles.

v) over Temperature Cut-off -

operating temp - of lithium-ion cells its cycle life. A B.M.S enforce the maxim temp the battery can achive during charging & during discharging. The temperature cut-off during charging is generally low than the temperature cutoff during discharging.

Q.3 What is the purpose of BMS With Communication? What are various protocols of Communication used in a BMS?

→ In BMS communication is more important to collect data history calculate battery performance battery charging & discharging duration. cell unbalancing also detect with the help of communication.

There is three type of BMS Communication in EV,

i) CAN (controlled area Network)

It is a robust vehicle bus standard design to allow microcontroller & device to communicate with each other Without host computer It can also implemented for commaicate the battery charger & the battery management system.

ii) UART With Bluetooth.

UART stand for universal Asychronous receiver transmitter & It Work With bluebooth.

iii) IoT Cloud Connectivity -

It required Wireless internet to transmit data.

Teacher's Signature:.....