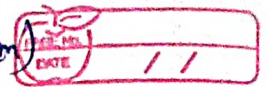


Assignment on Battery management System (BMS)



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 inside the battery pack.

ii) Type of B.M.S

There 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
ii) A variable resistor may be necessary to help balance cell or perform internal resistance measurements.	ii) Sample rate monitoring in the sensor system,
iii) Current, voltage & temperature should be measured to improve the capability of state tracking in real life application.	iii) 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.

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

→ When procuring battery pack must function 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 cell's 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 functioning in all aspects when operated at a particular charged discharge current.

iv) over voltage detection (OCD) -

It is maximum current the BMS can allow for a very short period of time. For 1kA, 500A. 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 max'm temp the battery can achieve 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 communicate the battery charger & the battery management system.

ii) UART With Bluetooth.

UART stand for universal ASynchronous receiver transmitter & it work with bluetooth.

iii) IoT Cloud Connectivity.

It required wireless internet to transmit data.