

1) What is a BMS? Types of BMS and differentiate the types of BMS.

Ans A BMS (Battery management System) manages a battery pack by protecting the battery from operating outside its safe operating zone by monitoring its state, controlling its environment, and balancing the lithium-ion cells inside the battery pack.

It can additionally calculating data and report data via various communication protocols.

Types of BMS.

#### \* HARDWARE BMS

A hardware BMS performs basic protection functions to keep the battery pack functioning as healthy as possible. The basic functions includes

- Overvoltage cut-off.
- Undervoltage cut-off.
- Continuous current.
- Over current detection
- Over temperature cut-off

#### \* SOFTWARE / SMART BMS

It has all the features of the hardware BMS but additionally can collect data, can have memory to store data and can transmit data via CAN, Bluetooth, etc.



Q<sub>2</sub>. What are the technical parameters to keep in mind while procuring a BMS for assembling a battery pack.

Ans. The technical parameters for procuring a BMS are.

- \* Nominal capacity
- \* Nominal voltage
- \* Discharge cut-off voltage
- \* charging voltage
- \* standard charging current
- \* standard discharging current
- \* Fast charging current
- \* Fast discharging current
- \* Max discharging current
- \* Internal impedance.
- \* Weight
- \* End of charge voltage.
- \* End of discharge volt.
- \* Charging & discharging temperature.  
(Operating temperature range).



Q3 What is the purpose of BMS with communication? what are the various protocols of communication used in a BMS.

Ans. In BMS communication is used for communication between devices. For example, a CAN 2.0 BMS sends communication from the battery to the vehicle control unit (VCU). It can continuously transmit data of the battery's thermal profile and monitor its temperature continuously. It uses the collected data points (Temperature, voltage, current) to estimate the SoC, SoA, etc of the battery pack. The data can either be stored (on-board storage) or can be transmitted by CAN to the VCU or sent to the cloud.

The various protocols of communication used in a BMS are.

- CAN (Controlled Area Network):

It is a robust vehicle bus standard designed to allow microcontrollers and devices to communicate with each other's applications without a host computer. It is also implemented for communication b/w the battery charger and the battery management system (BMS).

- BLUETOOTH

It is something that sends the data to the end users on their cell phone app. We saw the data as a screenshot on a cell phone in the smart BMS topic.



## IoT CLOUD CONNECTIVITY

It requires wireless internet and can transmit data to the cloud and it can be viewed remotely by anybody with an access.