Assignment 1

Part 3: BMS and BTMS.

Q1. What is a BMS? Types of BMS and differentiate the types of BMS?

→ 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 calculate data and report data via various communication protocols.

BMS Monitoring

BMS keeps a check on the key operational parameters during charging and discharging such.as voltages and currents and the battery internal and ambient temperature. The monitoring circuits would normally provide inputs to protection devices which would generate alarms or disconnect the battery from the load or charger should any of the parameters become out of limits.

Predefined Operating Conditions

Every BMS is going to be used in a different application that has a different pattern of battery architecture and different operating parameter. In order to achieve optimum battery performance and safety, it is necessary to understand what needs to be controlled and why it needs controlling. This requires an in-depth understanding of the fundamental cell chemistries, performance characteristics and operating temperature. Hence, a BMS is customized according to the application after know the predefined operating conditions.

Q2. What are the technical parameter to keep in mind while procuring a BMS for assembling a battery pack?
→ Technical parameter to keep in mind while procuring a BMS for assembling a battery pack as below:-

1) Nominal capacity
2) Nominal Voltage
3) Discharge cutoff voltage
4) Charging voltage
5) Standard charging voltage
6) Fast charging current
7) Fast discharging current
8) Max discharging current
9) Internal impedance

Q3) What is the purpose of BMS with communication? What are the various protocols of communication used 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 thermal profile and monitor its temperature continuously. It uses the collected data points (temperature, voltage, current) to estimate the state of charge (SOC), state of health (SOH), etc. of the battery pack. The data can either be stored (on-board storage), can be transmitted by CAN to the VCU or sent to the cloud.

Types of BMS Communication in EV
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 can also be implemented for communication between 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 of 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.