1. **Why do we need Power electronics switches in EV's?**

ANS: power electronics switches are indispensable in electric vehicles, enabling efficient energy conversion, precise control of motor speed, regenerative braking, and thermal management

2. **Mention types of Converters and Inverters used in EV's along with their location?**

ANS:

1) DC-DC Converter:

Type: Converts high-voltage DC from the main battery pack to lower-voltage DC for auxiliary systems such as lights, fans, and infotainment systems.

Location: Usually located near the battery pack or power distribution unit.

2) Onboard Charger:

Converts AC power from an external charging station or wall outlet to DC power for charging the traction battery.

Location: Integrated within the EV's charging system, typically near the battery pack.

3) Motor Inverter:

Converts DC power from the battery pack into three-phase AC power to drive the electric motor.

Location: Positioned near or integrated with the electric motor.

4) DC-AC Inverter (for auxiliary systems or onboard electronics):

Converts DC power from the battery or DC-DC converter into AC power for powering onboard electronics or accessories.

Location: Found in various locations depending on the specific application, often integrated within the power distribution system.

5) AC-DC Converter (for regenerative braking):

Converts AC power generated during regenerative braking into DC power for recharging the traction battery.

Location: Typically integrated with the motor inverter or located near the electric motor.

3. **Develop an Simulink Model of Step down (Buck) converter to vary voltage from 48V to 12V or step up (Boost) converter to vary voltage from 12V to 48V.(Assume the necessary data for modelling and mention assumptions clearly)**

ANS:

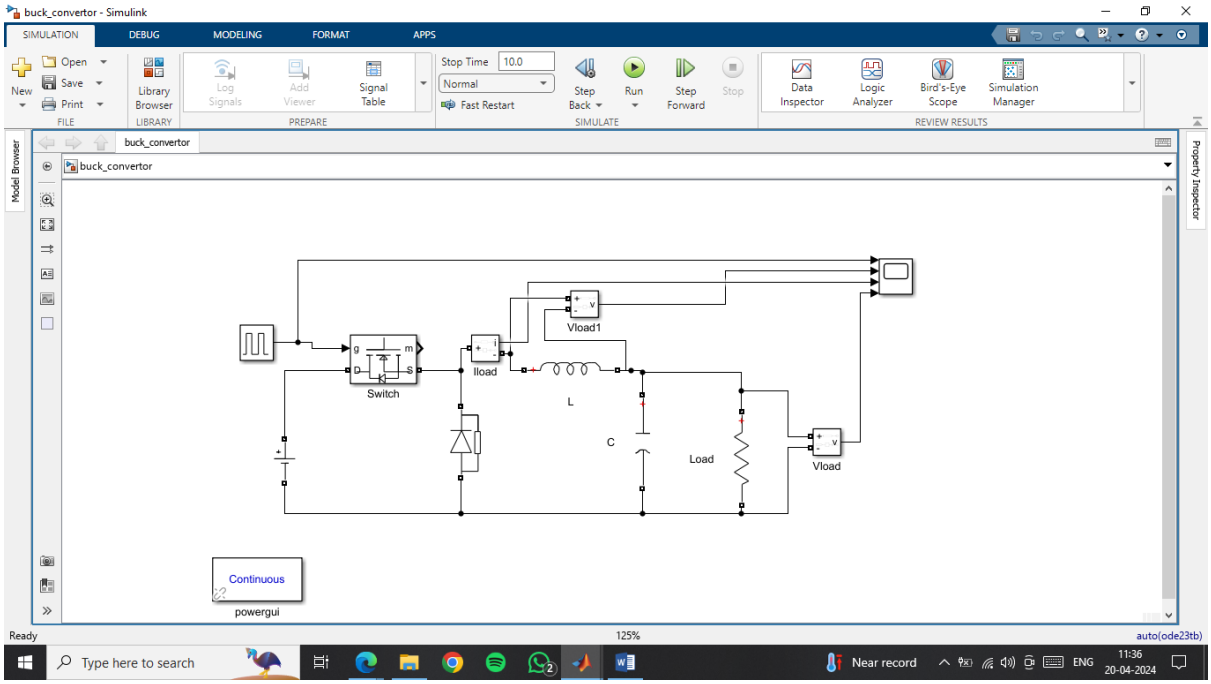
Assumptions: Ripple< 5%

Load Resistance: 8 ohms

Switching frequency: 10 kHz

1)

Buck Convertor: (48-12V)



2) Boost Convertor: (12-48V)