PROBLEM STATEMENTS FOR RECRUITMENT 2025
(ASTC ELECTRONICS DIVISION)

PROBLEM STATEMENT 1:

Title:
Design an optimal subsystem on LTSpice (or any equivalent circuit simulation software) that acts as an **intermediate interface between the High Voltage (Power) side and Low Voltage (Control) side** of a CubeSat.

Background:
In CubeSats, power generated by solar panels is typically stored in batteries (high voltage domain) and then distributed to control systems (low voltage domain) such as the OBC (On-Board Computer), sensors, and communication modules. Designing an efficient and stable interface between these two domains is crucial to prevent noise, instability, or overvoltage damage.

Objective:
You need to design and simulate a **DC-DC converter or voltage regulation subsystem** that ensures safe power transfer from the Power Bus (e.g., 12 V) to the Control Bus (e.g., 3.3 V or 5 V).

Requirements:

- Use **LTSpice** or similar circuit simulation software (e.g., Falstad, TinkerCAD Circuits).

- Clearly specify input and output voltage levels.

- Include **protection and filtering components** (capacitors, diodes, fuses, etc.) as required.

- Optimize the design for **efficiency, voltage stability**, and **low ripple**.

- Document your **component selection**, **design equations**, and **simulation results** (graphs of voltage/current over time).

Deliverables:

- Circuit schematic (LTSpice file or image).

- Short design report (1–2 pages) explaining the design logic, component selection, and results.