Given:S

- LED voltage: 12V
- Current limiting resistor: 3.3 ohms
- LiPo battery voltage: 11.1V
- Battery capacity: 5200mAh (11.1V)
- Desired duration: More than 5 hours
- Battery discharge limit: 80%

Solution:

1. Calculate LED Current:

LED current (I) = LED voltage (V_LED) / Current limiting resistor (R)

I = 12V / 3.3Ω ≈ 3.64A

2. Calculate LED Power:

LED power (P_LED) = LED voltage (V_LED) × LED current (I)

P_LED = 12V × 3.64A ≈ 43.68W

3. Calculate Total Energy Required:

Total energy (E_total) for 6 hours = LED power (P_LED) × Time (6 hours)

E_total = 43.68W × 6 hours ≈ 262.08 watt-hours

4. Calculate Energy of One Battery:

Energy of one battery = Battery capacity × Battery voltage

Energy of one battery = 5200mAh × 11.1V = 57.72 watt-hours

5. Calculate Usable Energy of One Battery (80% Discharge):

Usable energy of one battery = Energy of one battery × Discharge limit

Usable energy of one battery = 57.72 watt-hours × 0.80 = 46.18 watt-hours

6. Calculate Total Batteries Needed in Parallel:

Total batteries needed = Total energy required / Usable energy of one battery

Total batteries needed = 262.08 watt-hours / 46.18 watt-hours/battery ≈ 5.67 batteries

Since you can't have a fraction of a battery, round up to the nearest whole number:

Total batteries needed = 6 batteries

Conclusion:

To power the high-power 12V LEDs using 11.1V LiPo batteries for more than 5 hours, considering an 80% discharge limit, you would need at least 6 LiPo batteries connected in parallel. Note that this calculation provides an estimate, and real-world performance may vary due to various factors.