Task 5: PCB Power Distribution Board
Team B
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a) **State the efficiency of each of your regulators.**

For linear regulators, the efficiency is simply **1 – (Vin - Vout)/(Vin)**.
regulators that are used:
MIC29300-5.0WU (for WIFI and Encoder)
→ Efficiency = 1- (24-5)/24 = **20.83%**

MIC29300-3.3WU (for CPU)
→ Efficiency = 1 - (24-3.3)/24 = **13.75%**

MIC29300-12WU (for LIDAR)
→ efficiency = 1 - (24-12)/24 = **50%**

b) **State the input power used for each subsystem at maximum rated output.**

Subsystem	Max Power Output (Voltage * Current)	Power Dissipation by regulator $P_D = I_{OUT}(1.01V_{IN} - V_{OUT})$	Input Power Used
Wifi & Encoder (5V/ 1A)	5W	Pd = 1A (1.01*24V - 5V) = 19.24W	24.24 W
CPU (3.3V/1A)	3.3W	Pd = 1A(1.01*24V - 3.3) = 20.94W	24.24W
LIDAR (12V/2A)	24W	Pd = 2A(1.01*24V - 12) = 24.48W	48.48W
Motor (24V/10A)	240W	-	240W
Total	272.3W		336.96W

c) **State the total system efficiency at maximum rated output.**

= Total Output Power / Total Input power
= (272.3W / 336.96W) * 100%
= 80.81%