模块 5

测验：电池和电压调节

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Battery	Voltage (V)	Storage (mAh)	Type
碱性	5*1.5=7.5	2000	Primary
锂	5*1.5=7.5	3000	Primary
镍镉电池	6*1.2=7.2	1200	Secondary
镍氢电池	6*1.2=7.2	1800	Secondary
锂离子	2*3.6=7.2	1900	Secondary

表 1.用于为机器人供电的存储容量为 AA（5 号电池）型尺寸电池的输出电压约为 7V。

问题 1 电池

假设您的机器人正常工作时的电流为 0.5A，上图表 1 中列出的各种类型的电池可以持续使用多长时间？

问题 2 能量

计算存储在上图表 1 中列出的电池中的焦耳总能量，其中由于每一个机器人将会有很多个电池，因此电池输出电压将会高于 7 V。

A) 五种碱性电池的总能量是多少？

B) 五节锂电池的总能量是多少？

C) 六个镍镉电池的总能量是多少？

D) 六个镍氢电池的总能量是多少？

E) 两节锂离子电池的总能量是多少？

问题 3 电池

锂离子电池相比于表 1 中列出的其他电池好在哪里？如果，假设不考虑价格成本方面的因素，为什么锂离子电池会是机器人供电的最佳选择？这是为什么呢？

问题 4 定义

A) 稳压器的**效率**的定义是什么？

B) **功率预算**的定义是什么？

C) **压差**的定义是什么？

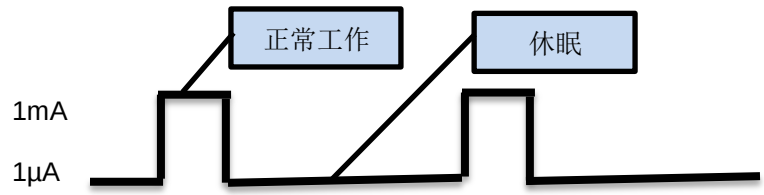
D) **可充电电池**的定义是什么？

问题 5 功率预算

如果一节电池可以存储 2.2A-hr，一个嵌入式系统正常工作运行电流 100mA，那么这节电池可以持续使用多久呢？

问题 6 功率预算

如果一个电池可以存储 500mA-hr，我们的嵌入式系统在正常工作的活动模式下运行需要耗电 1mA，在休眠模式下运行需要耗电 1μA。如果我们的系统需要在这个电池上持续运行 1 年，那系统应该在睡眠模式下的百分比是多少？



问题 7 功率

其中 MSP432 上的 Vcc 引脚用于给微控制器供电，假设一个简单的电阻模型用于 MSP432 中的集成电路。即，假设 Vcc 对地的电阻固定为 50Ω，例如，在 3.3 V 时，它的工作电流为 66mA。如果微控制器可以在 1.2V 下运行，那么节省的功率是多少？

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