TI-RSLK MAX

Texas Instruments Robotics System Learning Kit

Texas Instruments

Module 5

Activity: Building the robot

Activity: Battery and Voltage Regulation

Battery	Voltage (V)	Storage (mAh)	Type
Alkaline	5*1.5=7.5	2000	Primary
Lithium	5*1.5=7.5	3000	Primary
NiCad	6*1.2=7.2	1200	Secondary
NiMH	6*1.2=7.2	1800	Secondary
Li-ion	2*3.6=7.2	1900	Secondary

Table 1. Storage capacities of AA-sizes batteries used to power a robot at about 7V.

Question 1

Assume the robot requires 1 amp to operate. How long will each battery type listed in Table 1 last?

Question 2

Assume all batteries in Table 1 have the same weight. If cost were no object, which battery type would you choose and why?

Question 3

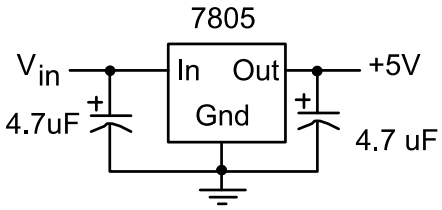
A battery can hold 400 mA-hr. The embedded system runs with 1 mA in active mode and 1 µA in sleep mode. If the system runs 99.99% of the time in sleep mode, how long will the battery last?

Question 4

What is the difference between a primary and secondary battery?

Question 5

What happens if the input voltage to the 7805 is 6V? What happens if the input voltage to the 7805 is 16V? What happens if the input voltage to the 7805 is 160V?



Question 6

What do the diode and inductor do in the LM2596 regulator circuit?

Question 7

Using the family of LM78xx regulators, build a power circuit for a +12V embedded system. What battery input voltage do you need?

Question 8

Using the family of LM2596 regulators, build a power circuit for a +3.3V embedded system. What battery input voltage do you need?

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Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265
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