6: 5A
6a: Current is too much
6b: It would burn the circuit, there would be too much current across the circuit.
7: It would provide enough resistance to control the current and not reach the maximum current.

LED in a Circuit:

1ai: Diode needs the long end to receive current, and the short end completes the circuit. The long end goes to the 5V and the short end to the gnd.
1b: voltage drop was 4.91V, we expected it to go down.
1c: voltage drop was 2.52V
2: It got brighter
3: We expect that as the resistance increases, the LED gets dimmer.
4: We expect the LED to be brighter , it does
5: 10v step up - blindingly bright
6: We could quantify the brightness by measuring the voltage across it.
7: When we switch the colors, there are some that are definitely not the same intensity of brightness. Yellow is nowhere near as bright as blue.

Photo Diode:

2: 8.4uA
3: When we cover the photo-diode, the voltage drops to 0
3a: Dark Current is 0.2uA
3b: Both are enough
3c: Current climbs to 11.7uA
4: Across the resistor, the saturation current is 0.02mA. Dark current is 0.2uA.