

Problem Set 1

Due 5:30PM on Monday, September 26, 2011.

Type your answers for the following questions in a word processor; we will accept Word Documents (.doc, .docx), PDF documents (.pdf), or plaintext files (.txt, .rtf). Before the due date, place the file into your "Pset 1" folder in the Dropbox folder we shared with you from project 1.

1. (25 points) Name and explain the four factors that affect exposure. What is the relationship between all four factors and exposure? Be sure to explain the complex relationships among each; how does each affect exposure when the factor is increased and decreased, assuming other factors remain constant? How must each change (if possible) to compensate for other factors? How does each impact the photo's appearance when the factor is increased and decreased, assuming the exposure is able to remain the same? What other consequences, if any, must the photographer acknowledge when modifying each factor? You may find creating a table helpful in answering this question.
2. (20 points) Give two reasons why it is a good idea to shrink the size of a photograph when it is to be sent via email or posted to a website. What is a reasonable resolution to export your photograph when sending one via email?
3. (15 points) Suppose there is a properly-exposed photograph outdoors using the Sunny 16 rule. Another properly exposed photograph is taken indoors at ISO 800, $f/2.8$, and at $1/50$ of a second. How many stops darker is it indoors than outdoors?
4. (10 points) Some conspiracy theorists claim that the moon landings were faked because, among other things, there are no stars in the backgrounds of photographs allegedly taken on the moon. Their explanation is that the thinner atmosphere on the moon would make stars visible in photographs. Using your knowledge of exposure, support or refute this evidence in an explanation no longer than a few sentences long. Can this evidence be reasonably used as proof in the theory that the moon landings were faked?
5. (10 points) Calculate the minimum and maximum F-number of the human eye. Assume a focal length of 22mm, a minimum diameter of 2mm, and a maximum diameter of 7mm. Be sure to show all work for full credit.
6. (10 points) An SLR has a mirror that reflects light coming from the lens into the viewfinder so that the photographer can see a preview of the photo before a photo is taken. In order for a camera to take a photo, though, it must move the mirror up before opening the shutter to expose the sensor. If the mirror does a good enough job of preventing light from reaching the sensor, why does an SLR also have a mechanical shutter?
7. (10 points) How many stops brighter is ISO 102,400 compared to ISO 100? How many times faster is it?