Quiz 07: Photoelectric Photometry of the Pleiades

61. The Pleiades
    - A) are a group of stars that appear close together in the sky, but are really unrelated to each other and are located at many different distances from the Earth.
    - B) are a related group of stars that appear close together in the sky, and are actually located in the same region of space. They are all about the same distance from the Earth.
    - C) are a group of stars spread out all over the sky. They are randomly located, unrelated to each other, and are all at different distances from the Earth.
    - D) are stars that are grouped together because they all appear to have the same brightness when viewed from the Earth. They are at different distances from the Earth.
    - E) are not stars at all. They are unusual because they are a group of extrasolar planets that can be easily observed from the Earth.

62. Why is is necessary to calibrate the sky before observing the star(s) you are interested in?
    - A) Because the background sky is so dark that the telescope will overexpose any stellar object unless you calibrate.
    - B) Because there are so many stars, the background sky is about as bright as any object you are trying to observe.
    - C) Because the star is viewed in the visible, but the background is infrared. Calibrating lets the telescope tell the difference.
    - D) It is not actually necessary. We calibrated because it was a simulation on the computer. An actual telescope looking at the actual sky would not have to be calibrated.
    - E) The sky is never perfectly black, so the photometer needs to know how much light is background "noise" and how much light is "signal," coming from the object you want to observe.

63. True or false: If you switch from the 0.4m telescope to the 0.9m telescope, you must repeat the sky calibration. It will be different for every telescope.

64. Using the **B** filter on the photometer
    - A) allows all light to pass through.
    - B) allows all light to pass except blue light.
    - C) blocks all incoming visible light and only allows ultraviolet light (UVB) through.
    - D) blocks all incoming e·m radiation, allowing only sound waves to pass through.
    - E) blocks all incoming light except a specific narrow range of blue wavelengths.

65. The **V** filter on the photometer
    - A) stands for **V**iolet. Only violet light passes.
    - B) stands for ultra**V**iolet. Only UV light passes.
    - C) stands for Visible. Only a narrow range of green frequencies pass through.
    - D) stands for **V**ery high frequency. Only x-rays and gamma rays are allowed to pass.
    - E) stands for **V**ery low frequency. Only long wavelength radio waves are allowed through.

66. You complete an observation trial, and notice that the S/N = 200.
    - A) This is impossible. By definition, the signal S is lower than the noise N. All S/N values are less than 1.
    - B) This is excellent data. The higher the S/N, the better the data.
    - C) This is unacceptable. Any S/N > 100 is not valid, and the data must be discarded.
    - D) This is marginal data. You will get better results by decreasing the exposure time.

67. You are observing a *very* dim star with the 0.4m telescope. Using an exposure time of 3 seconds (3 integrations of 1s intervals), you would expect
    - A) great results, and a high S/N (greater than 100).
    - B) average results, with S/N about 100.
    - C) poor results, and a low S/N (less than 100).
    - D) impossible to predict. Sometimes a dim star has a very high S/N, but sometimes it's low.

68. To minimize the exposure time when observing a dim object,
    - A) use the 0.4m telescope.
    - B) use the 0.9m telescope.
    - C) use the 4.0m telescope.
    - D) it does not matter which telescope you use.

69. As you recorded the B and V magnitudes for each star, what trend did you notice?
    - A) The B magnitude is always equal to the V magnitude.
    - B) The B magnitude is always about ten times larger than the V magnitude.
    - C) The V magnitude is always about ten times larger than the B magnitude.
    - D) Sometimes B is larger than V, and sometimes the V magnitude is larger than the B.

70. What is the general correlation between brightness and the magnitude number?
    - A) Brighter stars have smaller magnitude numbers.
    - B) Brighter stars have larger magnitude numbers.
    - C) Bright stars have magnitude = 1 and dim stars have magnitude = 0.
    - D) There is no pattern; a bright star might have a large number or a small number for its magnitude.