PHYS 125 Final Exam – practice version

I. Part 1. Multiple choices.

_____ 1. _____ Which of the pictures shown above were taken **without** a Polarizer?

(a) Left one.
(b) Right one.
(c) Both.
(d) Neither.

_____ 2. _____ In the picture above taken with the polarizer, what is the orientation of the polarizer?

(a) Horizontal.
(b) Vertical.
(c) 45° tilted.
(d) None of above.

_____ 3. _____ Nathan claims that one should see a bright-dark pattern in the shadow due to the interference if two spot lights are casted over a basketball onto the ground from two directions. Which of the following statement is true concerning Nathan's claim?

(a) The claim is true because the interference will occur with multiple light sources.
(b) The claim is false because the diffraction will occur and one should only see a bright spot at the center of the shadow.
(c) The claim is true because two shadows should be seen with the illumination of two spot lights, and this is a kind of bright-dark interference pattern.
(d) The claim is false because the spot light are not cohere light sources.
(e) The claim is false because the basketball is large compare with the wavelength of visible light and the interference pattern will be too small to be seen.

_____ 4. _____There is a color mixed with 1 share of pure red, 1 share of pure green and half share of pure blue. A room is painted to show this color under the illumination of white light. When this room is illuminated with **only** red light, and you step into the room with a pure blue sunglass, what color do you feel the room is?

(a) red.
(b) blue.
(c) green.
(d) magenta.
(e) cyan.

Part II. Comprehensive questions. (15 points each) Please answer each question carefully with a full explanation of your reasons. A short statement with a few words or just the conclusion is not acceptable.

1. Jack finds a color in the paint shop marked as R=35, G=50, B=15. (a) what color is it?
(b) please mark this color on the color tree (below) with a cross.
(c) what is the approximate saturation value of this color in the HSL notation?
(please also refer to the color picture on the screen.)
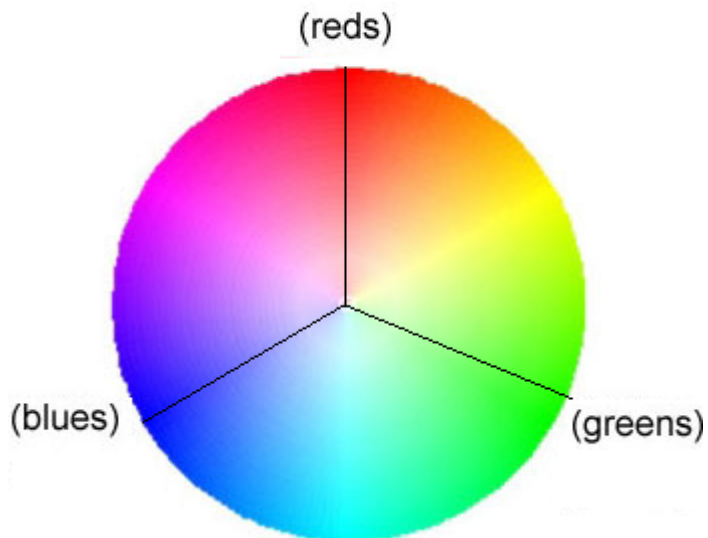
2. Suppose you have an unknown wave. It could be either an unpolarized transverse wave or a longitudinal wave. How would you determine if your unknown wave were transverse or longitudinal? Please also draw a diagram below to show your plan. (hint: you may recall what we did in the class to demonstrate the polarization of waves with the springs.)