**CS-555 Assignment 2: Written Part**

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PART A

Answer 1:

Looking at the R, G and B graphs, we can come up with the equation:

R + G + B = (R + G + B) + G

Hence the viewer would see a green color with high intensity.

Answer 2:

(a). As the gray level images are 8-bit images, the hue can only be divided into 256 values. Since hue values are normally represented in intervals from 0 to 360 degrees, the intervals for an 8-bit image would be 360/255. Therefore, yellow would have a gray level value of 43. The color green would have a gray level value of 85. The other two color regions would have the values 170 and 213 respectively.

(b). Since all the colors are part of the spectrum, they are fully saturated. Hence, the value 255 should apply to all the regions. And as the region in the center of the image is white, it would have a gray value of 0.

(c). Since the middle region is white, it would have equal saturation intensities of red, green and blue. The value of the two dark grey regions in the intensity image would have value 85. As equal proportions of cyan, magenta and yellow result in white, the two light grey regions would have value 170. And as the center region is white, it would have a value of 255.

Answer 3:

(a). The hue values would be 0, 0.33 and 0.66 for the red, green and blue colors respectively. Since it is given that the individual colored squares are fully saturated, the saturation values are 1. And since it is given that the colors are at the maximum intensity, the intensity image will be constant with a value of 1/3.

(b). Since the saturation image is constant, applying the smoothing mask will produce the same constant output.

(c). Applying the smoothing mask on the single color space would result in no blurring. Applying the mask between the red and green border, the values would vary between 0 and 0.33. Similarly, on applying the mask between the green and blue border would result in values between 0.33 and 0.66.

PART B:

Answer (I):

(a). DCT coefficients using eight point DCT:

33.0, -1.0, -1.1, 0.3, -1.2, -0.2, 0.4, 0.2

0.3, 4.1, 0.2, 4.9, 2.2, 8.2, 1.6, 20.2

(b). DCT coefficients using sixteen point DCT:

23.22, 21.80, -3.90, -6.96, -0.70, 6.04, -3.22, -2.58, 0.73, 3.18, -6.14, 1.58, 1.62, 5.55, -14.19, 13.30

(c). Using the sixteen point DCT, the compression size decreases and the amount of blur increases.