Midterm Solutions

April 1, 2016

1

$$I_1 = I_{max}(\frac{a_1}{255})^\gamma + I_{min} \tag{1}$$

$$I_2 = I_{max}(\frac{a_2}{255})^\gamma + I_{min} \tag{2}$$

Subtracting the two equations,

$$I_1 - I_2 = I_{max}\frac{a_1^\gamma - a_2^\gamma}{255^\gamma} \tag{3}$$

$$I_{max} = \frac{(I_1 - I_2)255^\gamma}{a_1^\gamma - a_2^\gamma} \tag{4}$$

Put the value of I_{max} in the original equations to get the value of I_{min},

$$I_{min} = I_1 - \frac{(I_1 - I_2)a_1^\gamma}{a_1^\gamma - a_2^\gamma} \tag{5}$$
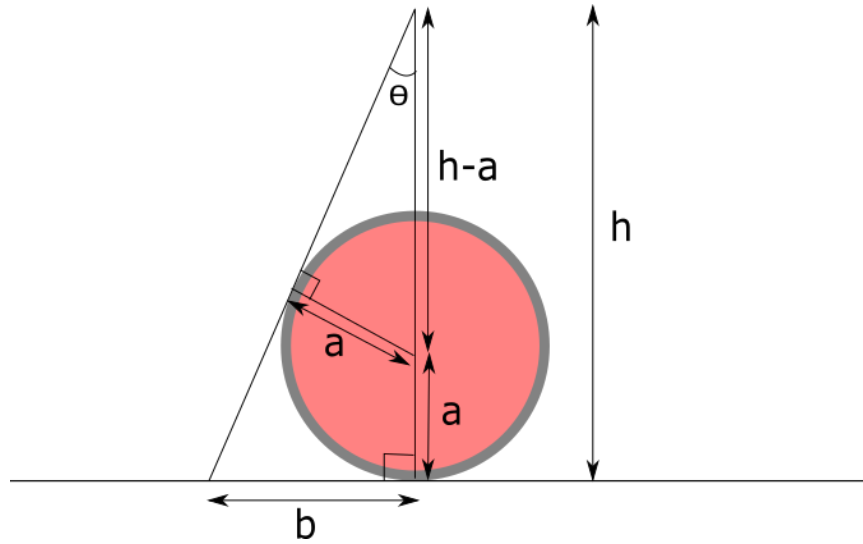
2

- True

- False

- True

- True

Figure 1: Question 3

3

Refer to Figure 1

$$sin\theta \;=\; \frac{a}{h-a} \tag{6}$$

$$tan\theta \;=\; \frac{b}{h} \tag{7}$$

$$\frac{sin\theta}{cos\theta} \;=\; \frac{b}{h} \tag{8}$$

$$(sin\theta)^2 \;=\; \frac{b^2}{h^2}(1-(sin\theta)^2) \tag{9}$$

$$h^2\frac{a^2}{(h-a)^2} \;=\; b^2(1-\frac{a^2}{(h-a)^2}) \tag{10}$$

$$a^2h^2 \;=\; b^2(h^2-2ah) \tag{11}$$

$$a^2h \;=\; b^2h-2ab^2 \tag{12}$$

$$h \;=\; \frac{2ab^2}{b^2-a^2} \tag{13}$$

4

http://www.inf.ed.ac.uk/teaching/courses/cg/lectures/cg15_2013.pdf

5

- Diffuse

- Ambient

- Specular