2005 Paper 6 Question 6

Computer Graphics and Image Processing

(*a*) The illumination at a specific point can be calculated using the formula:

$$I = I_a k_a + \sum_i I_i k_d (\mathbf{L}_i \cdot \mathbf{N}) + \sum_i I_i k_s (\mathbf{R}_i \cdot \mathbf{V})^n.$$

Explain what real effect each of the three terms is trying to model, how accurately it models the real effect, and explain what each of the following symbols means, within the context of this formula:

$$I, \; I_a, \; i, \; I_i, \; k_a, \; k_d, \; k_s, \mathbf{L}_i, \; \mathbf{N}, \; \mathbf{R}_i, \; \mathbf{V}, \; n.$$

[12 marks]

(*b*) Compare and contrast the ray tracing and *z*-buffer algorithms. [8 marks]