

2001 Paper 13 Question 4

Computer Graphics and Image Processing

- (a) Describe the z -buffer polygon scan conversion algorithm. [10 marks]
- (b) In ray tracing, once we have determined where a ray strikes an object, the illumination at the intersection 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 and explain what each of the following symbols means, within the context of this formula:

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

[10 marks]