

2007 Paper 3 Question 5

Computer Graphics and Image Processing

(a) In image compression we use three different mechanisms to compress pixel data:

- (i) mapping the pixel values to some other set of values;
- (ii) quantising those values;
- (iii) symbol encoding the resulting values.

Explain each mechanism, describe the way in which it helps us to compress the image, and describe how the mechanism is implemented in the baseline JPEG compression method. [10 marks]

(b) Describe the limitations of human vision in terms of:

- (i) spatial resolution,
- (ii) luminance,
- (iii) colour,

and explain the implications that each of these has on the design of display devices, including numerical estimates of the limits beyond which a human cannot discriminate. [10 marks]