

## 2007 Paper 8 Question 6

### Computer Vision

- (a) Briefly define each of the following concepts as it relates to vision:
- (i) “signal-to-symbol converter”; [2 marks]
  - (ii) “inverse graphics”; [2 marks]
  - (iii) blurred Laplacian operator; [2 marks]
  - (iv) volumetric coordinates; [2 marks]
  - (v) correspondence problem. [2 marks]
- (b) Give *three* examples of methodologies or tools used in Computer Vision in which Fourier analysis plays a role, either to solve a problem, or to make a computation more efficient, or to elucidate how and why a procedure works. For each of your examples, clarify the benefit offered by the Fourier perspective or implementation. [6 marks]
- (c) When designing a pattern classifier, what roles are played by within-class variability and between-class variability? Which one is helpful and which one is undesirable? How should the definition or selection of features reflect these two kinds of variability? Illustrate these points in the context of face recognition. [4 marks]