

**9 Further Human–Computer Interaction (afb21)**

Consider the design of a future integrated software development environment (IDE) that supports three different modes of interaction: (1) direct manipulation via a touch screen, (2) text and command entry via a keyboard, and (3) voice audio interaction.

- (a) For *each of these three* interaction modes, describe a specific software development task that will be especially appropriate for completion using that mode. [3 marks]
- (b) The three tasks that you have described, together with the three interaction modes, define a matrix of nine different task-mode combinations, some of which will be appropriate and effective, and some of which will be inappropriate or ineffective. Choose *five* of these possible task-mode combinations, and for *each of the five*, use one of the Cognitive Dimensions of Notations to justify why you expect this combination to be a good or bad design choice. [10 marks]
- (c) Describe how you would set up a study to test these predictions, considering choice of participants, instructions you would give them, and data you would collect. [2 marks]
- (d) Sketch an original design for an IDE suitable for interactive devices where use of an alphanumeric keyboard is not practical (for example, a smart watch), so that only modes 1 and 3 are available. Include an explanation of how this would be used for a simple programming task. [5 marks]