

## 2007 Paper 12 Question 4

### Distributed Systems

(a) Define the characteristics of middleware based on the following interaction paradigms:

(i) request-reply;

(ii) one-to-one message passing.

Discuss any limitations imposed by the paradigms and mention the properties of the application domains for which each is particularly suited. [9 marks]

(b) Web Services standards have been specified relatively recently. What does the Web Services paradigm offer? [3 marks]

(c) (i) Define the publish/subscribe communication paradigm. [2 marks]

(ii) What does this paradigm provide that is lacking in the three described above in parts (a) and (b)? [3 marks]

(iii) What are the shortcomings of publish/subscribe? [3 marks]