



QUESTION WORKBOOK

Shortest paths: Dijkstra and Floyd

Decision Mathematics 1 · Year FM

6 questions · 20 marks

NAVY SCREEN EDITION

SECTION A · Warm-up

A1 Describe what the three parts of a Dijkstra label record. [2]

A2 A Dijkstra run gives final labels A 0, B 5, C 7, D 9, E 13, F 15. Given that CE has weight 6 and EF weight 2, find the shortest route from A to F. [3]

SECTION B · Standard

B1 For the same network, the edges AD and DF have weights 9 and 10. Explain why the route A, D, F is not shortest, and what Dijkstra did when it examined D. [4]

- B2** In a Floyd distance matrix the entry from A to E is currently unreachable, A to C is 7 and C to E is 6. State what the C iteration does to both matrices. [4]

- B3** Explain why Dijkstra's algorithm makes permanent the smallest temporary label anywhere, rather than the cheapest edge from the node it has just finished with. [3]

SECTION C · Stretch

- C1** Compare the work involved in solving an all-pairs shortest path problem by Floyd's algorithm and by repeated use of Dijkstra's. [4]