**Decision Homework D Dijkstra’s Algorithm**  **Total: 25 marks**

1.

124

75

125

95

74

67

101

147

78

102

118

135

### G

### E

### C

### D

### A

### F

### B

### H

The network shows a network of paths. The number on each arc gives the length, in metres, of that path.

Use Dijkstra’s algorithm to find the shortest distance from A to H. **(5)**

Jan 05

2. A 15 F

6

3

E

18

T

3 8

22 D 2

8 10

S B G

6

17 11

7

C 15 H

The diagram shows a network of roads. The number on each edge gives the time, in minutes, to travel along that road. Avinash wishes to travel from S to T as quickly as possible.

(a) Use Dijkstra’s algorithm to find the shortest time to travel from S to T. **(5)**

(b) Find a route for Avinash to travel from S to T in the shortest time. State, with a reason, whether this route is a unique solution. **(2)**

On a particular day Avinash must include C in his route.

(c) Find a route of minimal time from S to T that includes C, and state its time. **(3)**

Jun 04

3.

*A*

*H*

*G*

*I*

*F*

*E*

*D*

*C*

*B*

*J*

17

6

10

15

4

15

13

29

27

13

17

3

14

18

15

12

11

18

The diagram shows a network of roads. The number on each arc represents the length of that road in km.

(a) Use Dijkstra’s algorithm to find the shortest route from A to J. State your shortest route and its length. **(5)**

(b) Explain how you determined the shortest route from your labelled diagram. **(2)**

The road from C to F will be closed next week for repairs.

(c) Find the shortest route from A to J that does not include CF and state its length. **(3)**

Jun 05