Question 2 (8 marks)
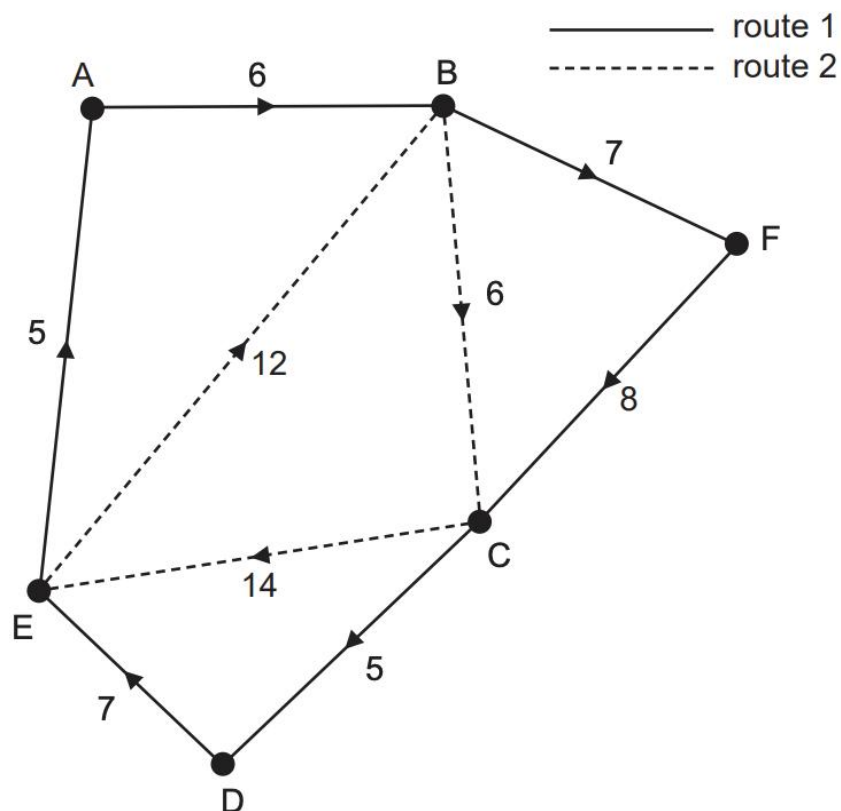
A bus company conducts 'jump on, jump off' sightseeing tours, during which tourists can get on and off buses at any of the designated attractions as many times as they like during the same day. The weighted digraph below shows Attractions A to F, along with the time (in minutes) that a bus takes to travel between the attractions. The bus company operates two different circuits around the city, each shown differently below.

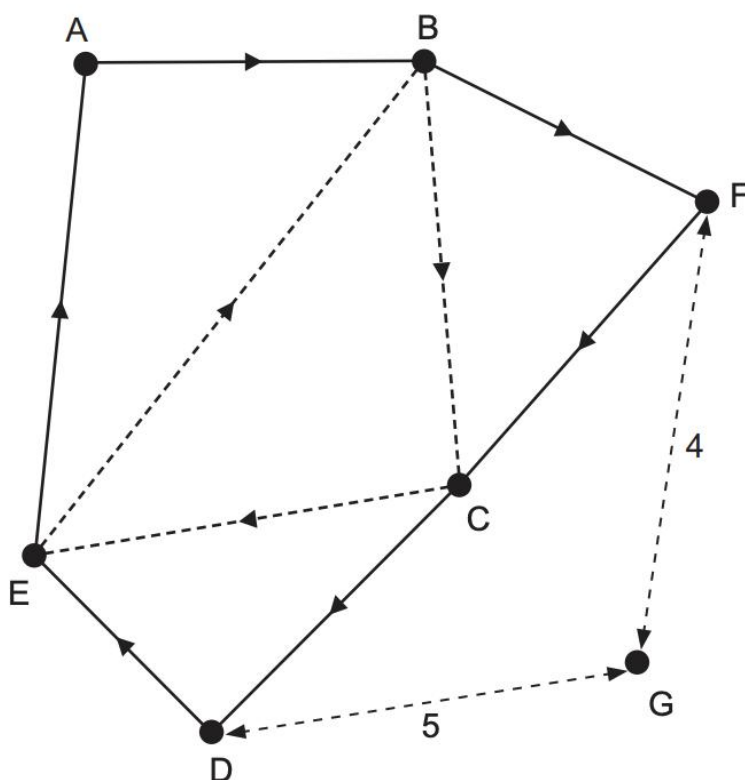(a)   Complete the adjacency matrix for the digraph.   (2 marks)

	A	B	C	D	E	F
A	0	1	0	0	0	0
B	0	0	1	0	0	1
C	0	0	0	1	1	0
D	0	0	0	0	1	0
E	1	1	0	0	0	0
F						

(b)   Mai gets on a bus at E. She travels directly to B, changes bus, and continues travelling BFCDEA. Explain why her route is a trail.   (2 marks)

(c)   Vinh has just visited Attraction C and wishes to visit Attraction B next. Determine the
       route he should take to arrive at B in the shortest travelling time. State the time taken.

       (2 marks)

The bus company plans to include another attraction, G. Instead of adding another circuit, they
will provide shuttle buses between F and G (four minutes in each direction) and D and G (five
minutes in each direction), as shown below.

(d)   Toshi is at Attraction D. He wants to complete a Hamiltonian path. State the route he should take.

(2 marks)