

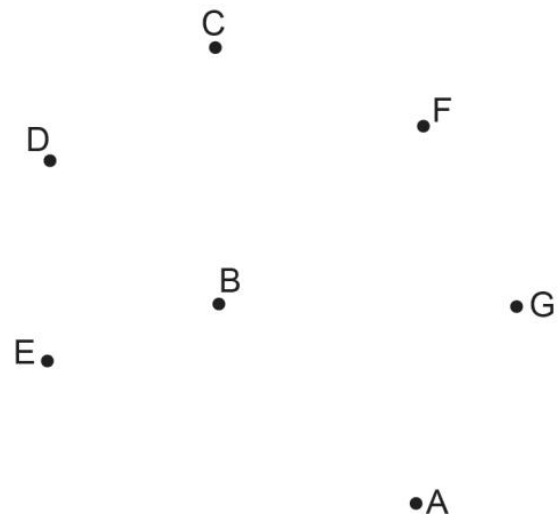
Question 15

(8 marks)

An express bus service runs between seven adjacent shopping centres in the city. Below is an adjacency matrix of the seven shopping centres, A to G.

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

- (a) Draw the network diagram associated with the adjacency matrix, assuming the arcs are undirected. (3 marks)



- (b) The buses only run between adjacent shopping centres. However, a passenger can buy a multi-stage ticket at any shopping centre. A one-stage ticket means a passenger can travel from one shopping centre to an adjacent shopping centre, such as:
- $A \rightarrow B$  or  $A \rightarrow E$  etc.

Similarly for a two-stage ticket:

- $A \rightarrow B \rightarrow A$  which is a return journey
- $A \rightarrow B \rightarrow C$  which is a one-way journey.

- (i) What feature on the adjacency matrix tells us that the buses run in both directions between adjacent shopping centres? (2 marks)

- (ii) How many different one-stage journeys are available from shopping centre B? (1 mark)

- (iii) List **all** the different two-stage, one-way journeys available from shopping centre B. (2 marks)