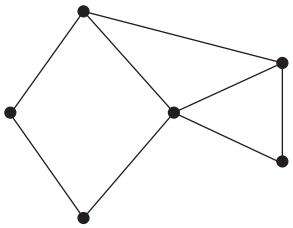
Module 2 – Networks and decision mathematics

Before answering these questions, you must **mark** the 'Networks and decision mathematics' box on the answer sheet for multiple-choice questions.

Use the following information to answer Questions 1 and 2.

Consider the graph below.



Question 1

Which one of the following calculations could be used to calculate the number of faces in the graph above?

A. $6 - f - 8 = 2$
B. $6 - 8 + f = 2$
C. $6 - f - 2 = 8$
D. $8 - 6 - f = 2$
E. $8 - 6 + f = 2$

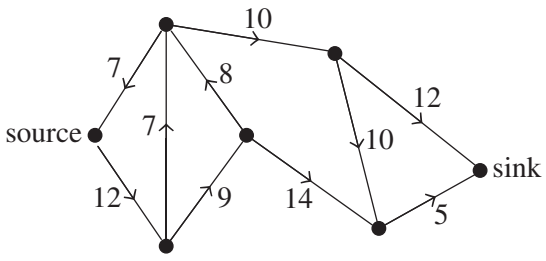
Question 2

The sum of the degrees of the vertices in the graph above is

A. 6
B. 8
C. 15
D. 16
E. 17

Question 3

Consider the graph below.



The maximum flow for the graph is

A. 15
B. 16
C. 17
D. 19
E. 24

Module 2 – Networks and decision mathematics

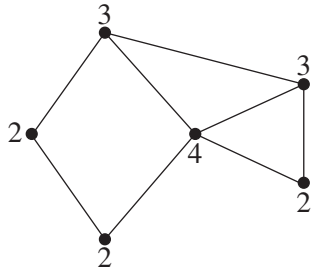
Question 1 **B**

Euler's formula is vertices – edges + faces = 2

There are six vertices and eight edges.

Substituting in with faces missing gives 6 – 8 + f = 2.

Question 2 **D**



2 + 2 + 2 + 3 + 3 + 4 = 16

Question 3 **A**

The maximum flow is equal to the minimum cut, which is 15.

Question 4 **E**

The critical path is *A–C–E–I–J* (5 + 3 + 4 + 10 + 3 = 25).

Question 5 **A**

The difference between the earliest start time and the latest start time is 1.

Question 6 **A**

Stage *B* takes 3, so stage *F* can start after 3.

Question 7 **A**

Belle is the only person who has a zero for project 1, and so she should complete project 1 and not project 2 to minimise completion time.

Question 8 **D**

6 + 5 + 3 + 4 + 3 + 5 = 26

Question 9 **A**

An Eulerian trail must start and end on an odd vertex. Currently there are 4 odd vertices, so 2 of these must be joined to make them even vertices. Of the options given, only *B* and *E* are both odd vertices.

Question 10 **C**

6 + 4 + 3 = 13, which is the shortest route, so the answer is *A–B–D–F*.

