

QQQ – Decision 1 – Chapter 2 – Graphs and Networks (Version 1)

Total Marks: 25

(25 = Platinum, 23 = Gold, 20 = Silver, 17 = Bronze)

1. Explain what is meant, in a network, by

- (a) a walk, (2)
- (b) a tour. (2)

(Total 4 marks)

Edexcel D2 June 2008 Q2

2.

- (a) Draw the graph K_5 (1)
- (b) (i) In the context of graph theory explain what is meant by ‘semi-Eulerian’.
- (ii) Draw two semi-Eulerian subgraphs of K_5 , each having five vertices but with a different number of edges. (3)
- (c) Explain why a graph with exactly five vertices with vertex orders 1, 2, 2, 3 and 4 cannot be a tree. (2)

(Total 6 marks)

Edexcel AS June 2019 Q1

3.

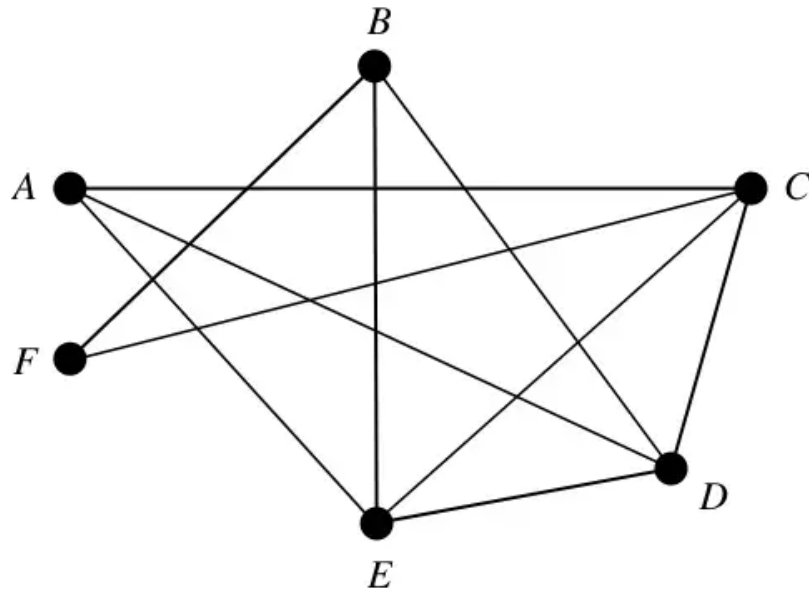


Figure 1

(a) Starting from A ; write down a Hamiltonian cycle for the graph in Figure 1. (2)

(b) Use the planarity algorithm to show that the graph in Figure 1 is planar. (3)

Arcs AF and EF are now added to the graph.

(c) Explain why the new graph is not planar. (2)

(Total 7 marks)

4.

- (a) Explain why it is **not** possible to draw a graph with exactly six nodes with degrees 1, 2, 3, 4, 5 and 6 (1)

A tree, T , has exactly six nodes. The degrees of the six nodes of T are

$$1 \quad 2 \quad (4 - x) \quad (2x - 5) \quad (4x - 11) \quad (3x - 5)$$

where x is an integer.

- (b) Explain how you know that T cannot be Eulerian. (1)
- (c) (i) Determine the value of x
- (ii) Hence state whether T is semi-Eulerian or not. You must justify your answer. (5)

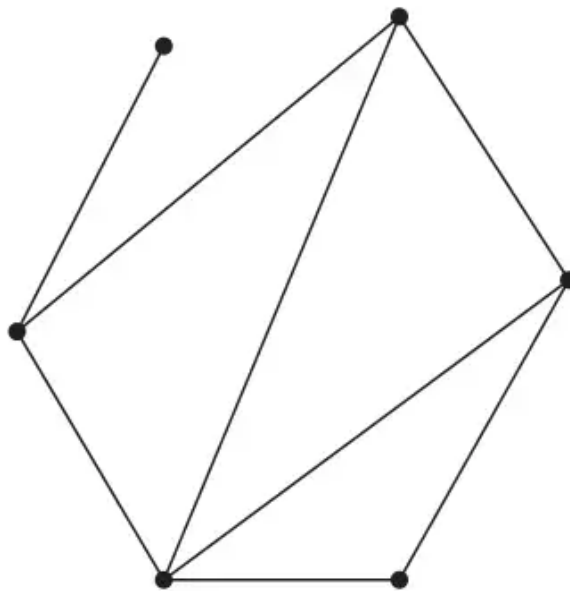


Figure 2

Figure 2 shows a graph, G , with six nodes with degrees 1, 2, 3, 3, 3 and 4

- (d) Using the vertices in Diagram 1 in the answer book, draw a graph with exactly six nodes with degrees 1, 2, 3, 3, 3 and 4 that is **not** isomorphic to G . (1)



Diagram 1

(Total 8 marks)

Edexcel A2 June 2024 Q4