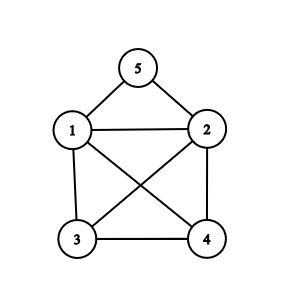
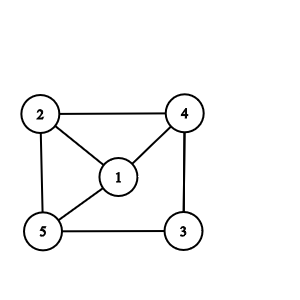
**Question 1**

**a)**

(i) 3,3,3,3,2

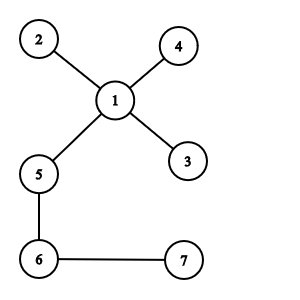
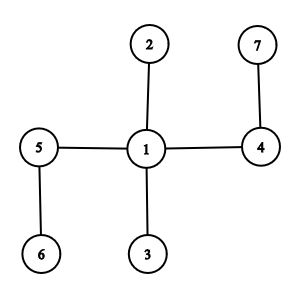
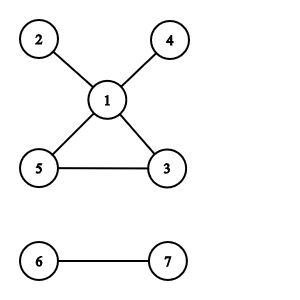


(ii) 3,3,3,2,2



**b)**

1,1,1,1,2,2,4



**c)**

**Number of Edges**

Therefore, the number of edges of the compliment of is 24

**Question 2**

a)

Let f be a bijective function from to

Let the correspondence between the graphs be

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 1 | 2 | 3 | 4 | 5 | 6 |
| a | b | c | d | e | f |

Therefore, the pair of graphs and are isomorphic

b)

Let f be a bijective function from to

Let the correspondence between the graphs be

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 1 | 2 | 3 | 4 | 5 | 6 |
| a | d | b | c | f | e |

Therefore, the pair of graphs and are isomorphic

**Question 3**

1

2

3

4

5

6

**Euler's Formula for Planar Graphs**

By Euler’s formula, the graph has 7 faces which corresponds to the planar graph drawn above

Therefore, is planar.

**Question 4**

**Handshake Lemma**

The sum of degree of all vertices of a graph is twice the size of graph.

Assume that there exists a planar graph with all vertices having degree at least 6

Then:

If is planar, then we know that .

*The graph G would have at least 3 vertices*

Thus

which is a contradiction,

Thus, every planar graph has a vertex of degree at most s

**Question 5**

**Euler's Formula for Planar Graphs**

But does not have 9 faces, therefore it is not planar.

**Question 5**

Step 1: Find a circuit that contains all the vertices of our graph

a-b-c-h-g-f-j-i-d-e

a

f

j

i

d

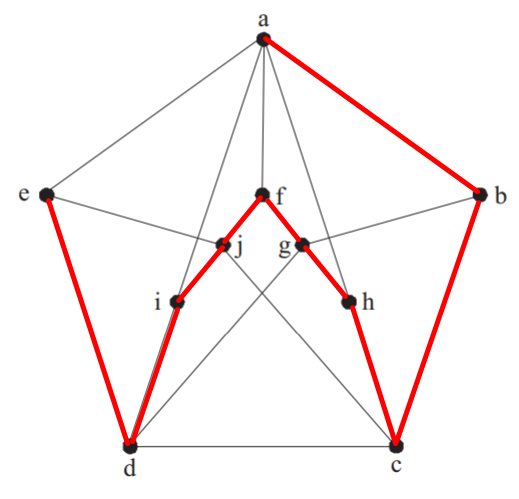
e

b

c

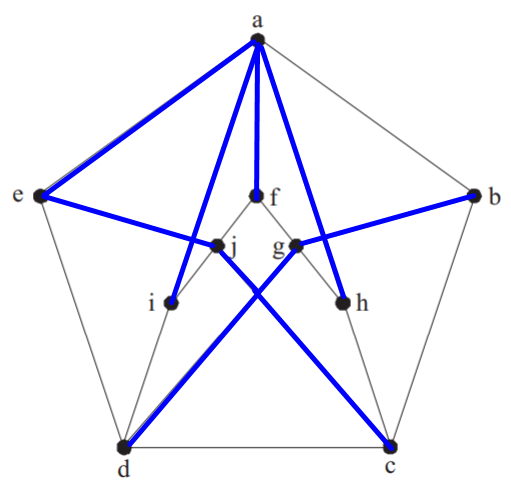
h

g



(draw it as a large circle)

Step 2: The remaining non-circuit edges, called chords, must be drawn either inside or outside the circle in a planar drawing.



a

f

j

i

d

e

b

c

h

g