**Problem 1.** Classify, up to isomorphism, all connected graphs (simple or not simple) with 5 vertices and 5 edges. You may use the fact (from lecture) that every simple, connected graph with 5 vertices and 5 edges is isomorphic to exactly one of the following:

![Graphs](image)

**Problem 2.** Which edges in this graph are bridges? Explain your answers.

![Graph](image)
Problem 3. Find a minimum weight spanning tree for this, following Kruskal’s algorithm. Do not just draw your final answer. Show enough intermediate stages to the grader can see the basic order in which you added edges.

Problem 4. Let $G$ be a graph with 4 connected components and 20 edges. What is the maximum possible number of vertices in $G$? (Do not just use a theorem to exclude higher numbers of vertices. Verify, perhaps by drawing an example, that the number you claim can be occur.)