

Graus de Liberdade Critério de Gruebler

Solução dos Exercícios

Exercício 1

$$F = 3 \cdot (4 - 1) - 2 \cdot 4 - 0 = 1 \text{ g.l.}$$

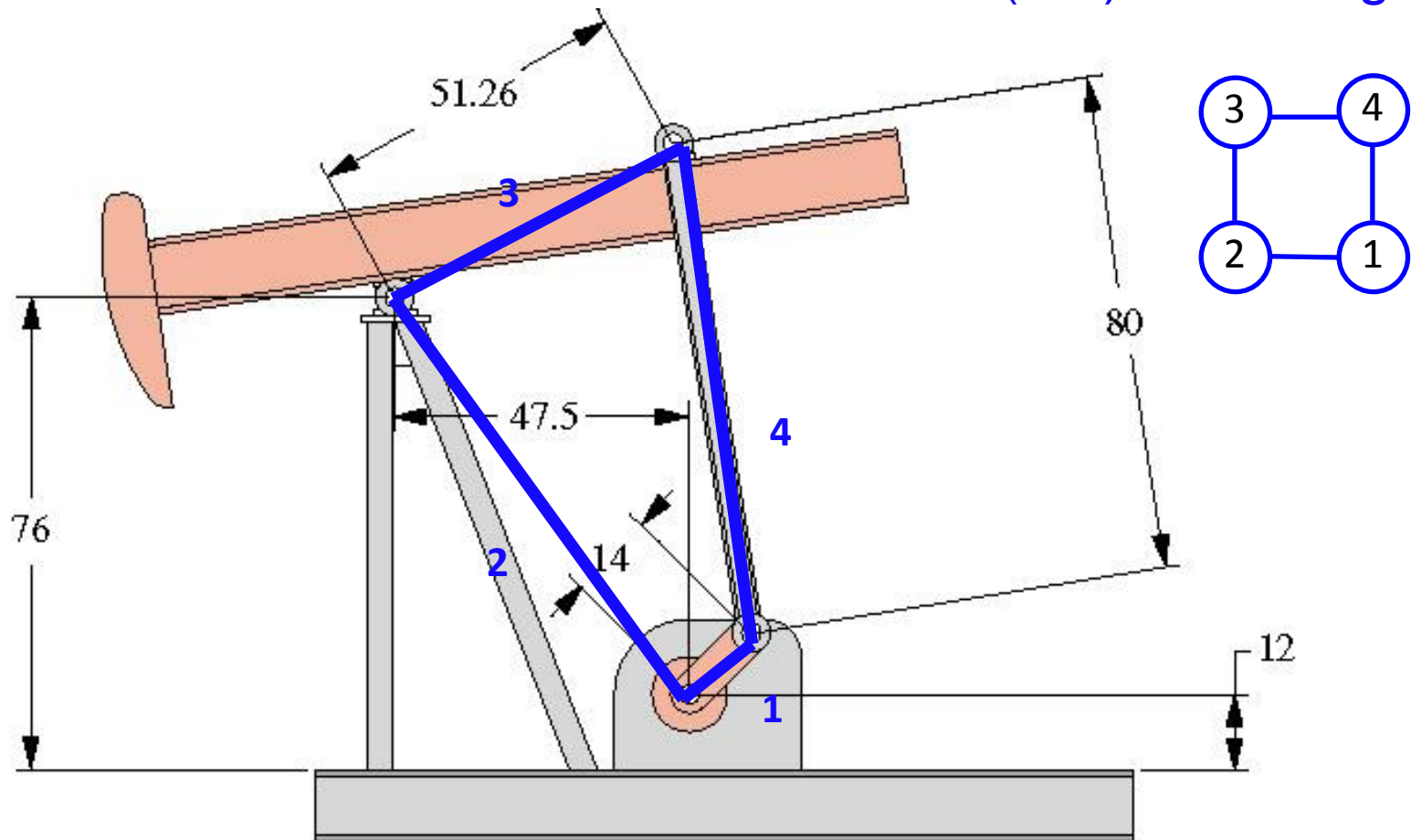
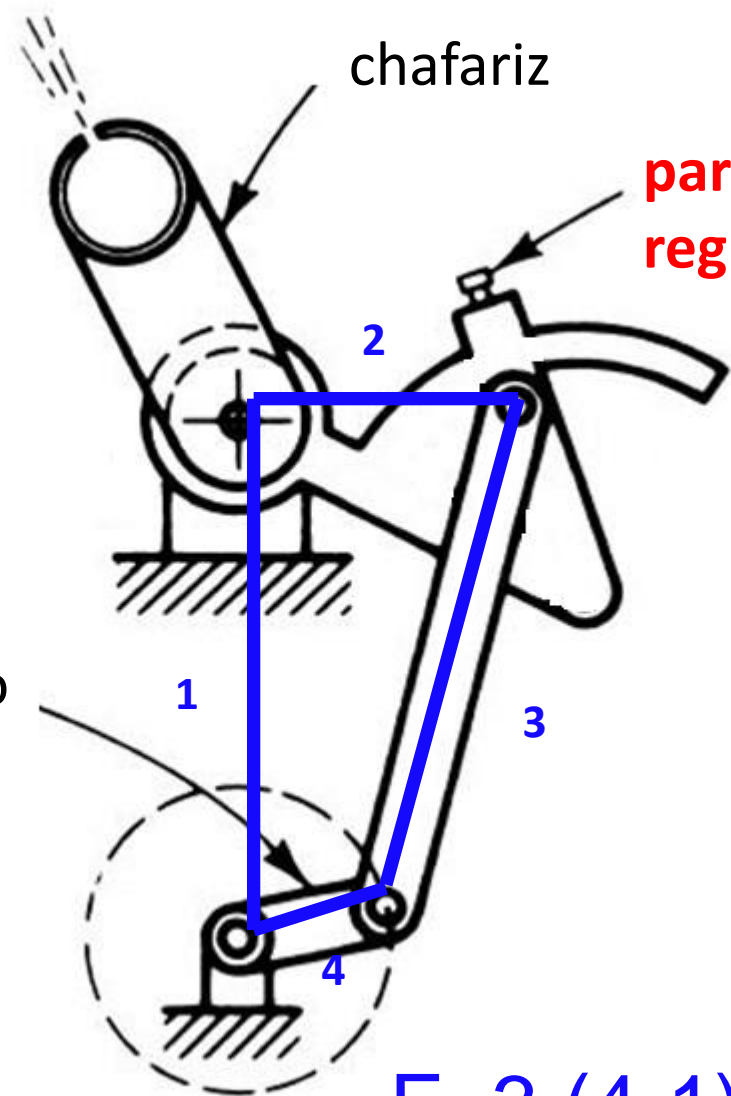
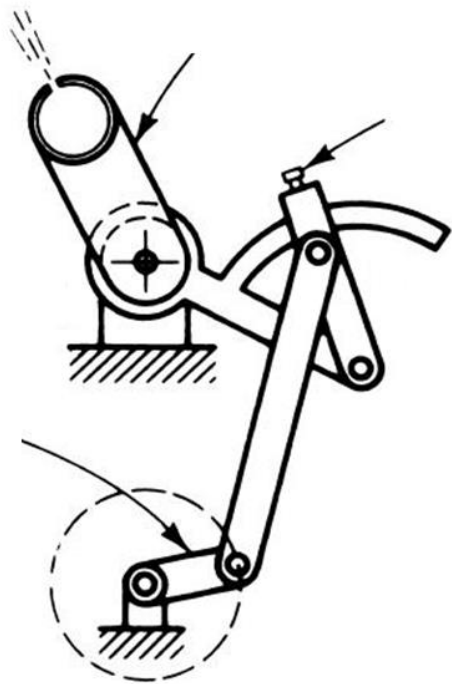


FIGURE P2-18

Problem 2-42 An oil field pump - dimensions in inches

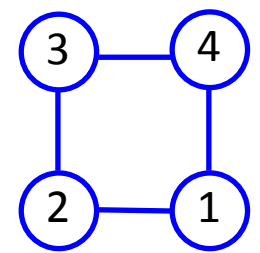
Exercício 2 – Hidrante (a)



acionamento

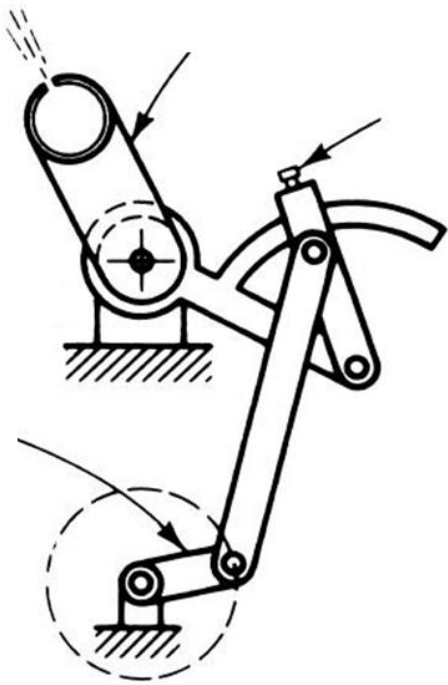
chafariz

parafuso de regulagem apertado

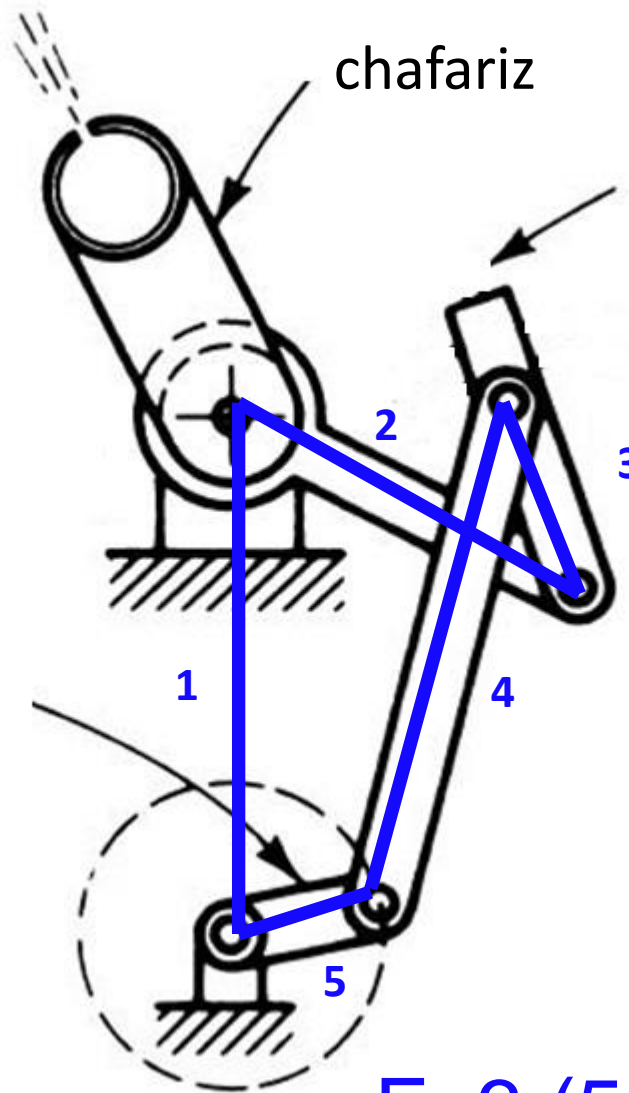


$$F = 3 \cdot (4 - 1) - 2 \cdot 4 - 0 = 1 \text{ g.l.}$$

Exercício 2 – Hidrante (b)

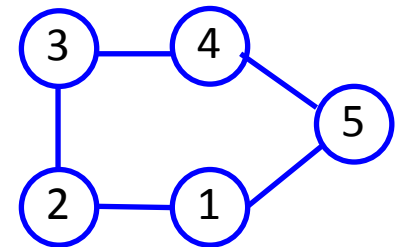


acionamento



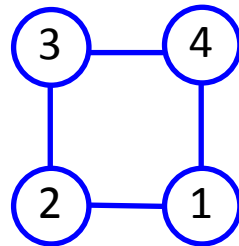
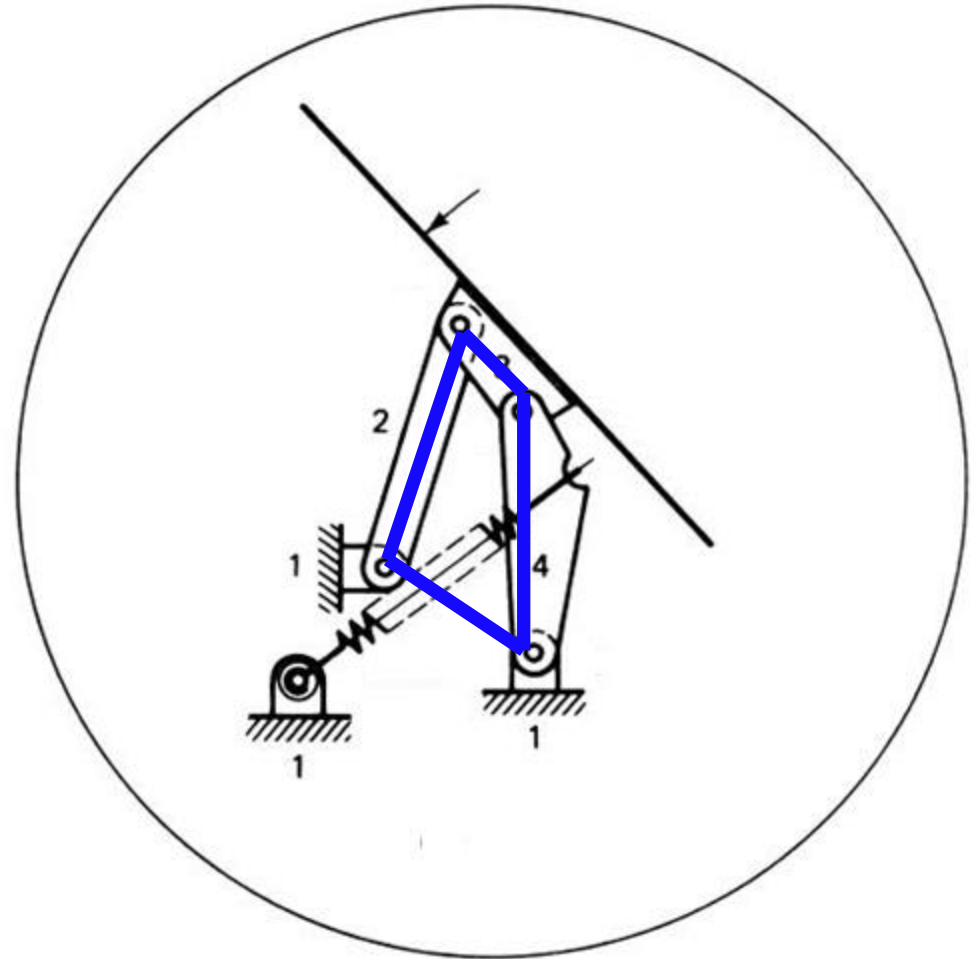
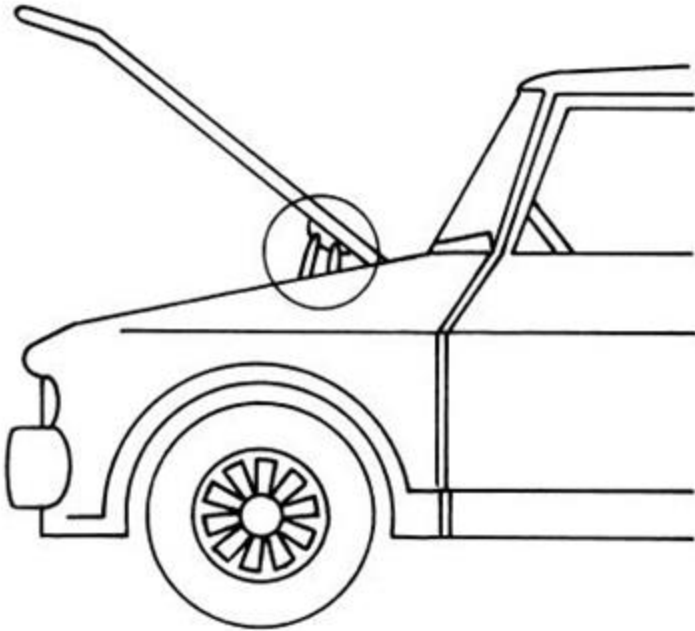
chafariz

parafuso de
regulagem solto



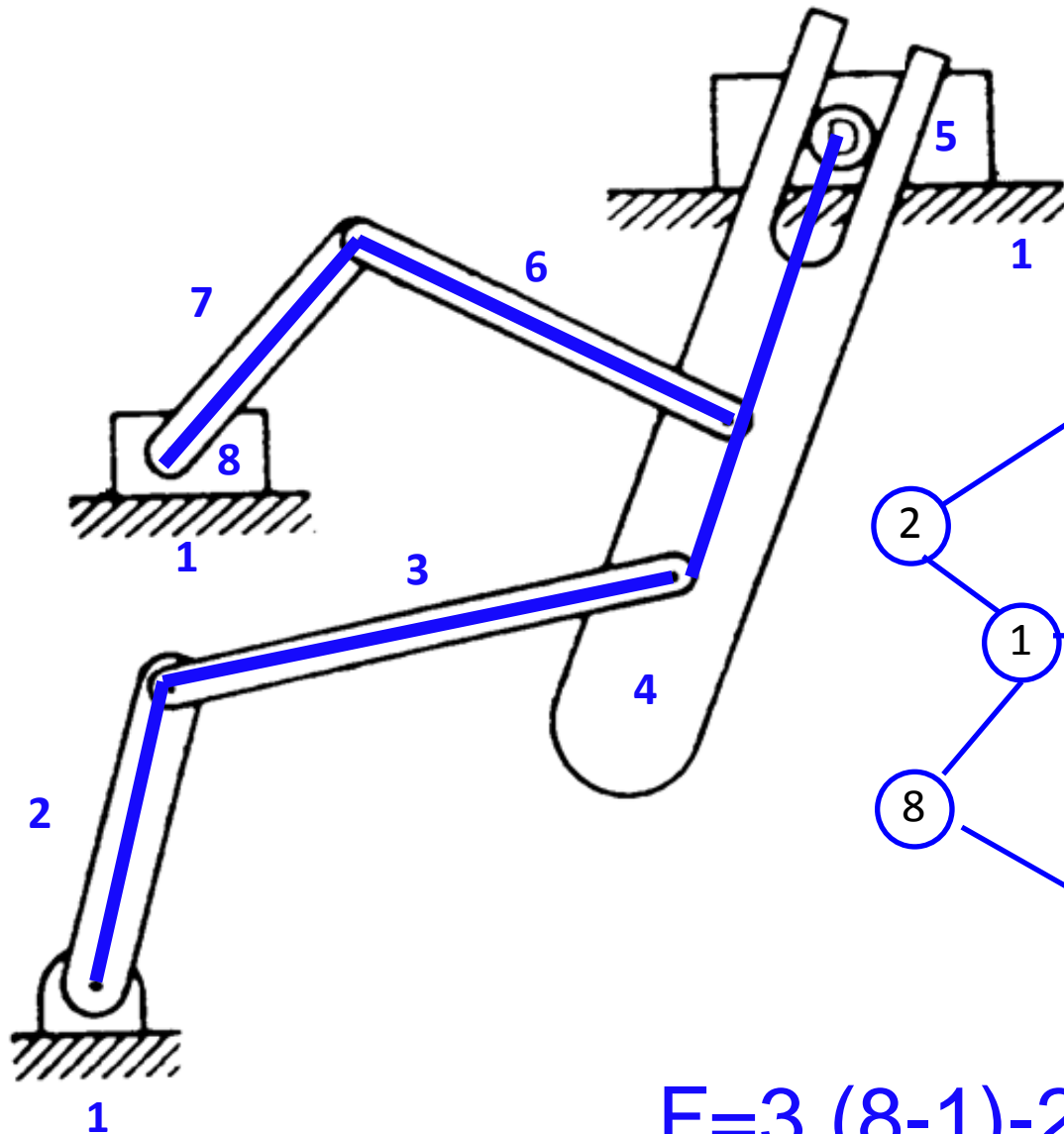
$$F = 3 \cdot (5 - 1) - 2 \cdot 5 - 0 = 2 \text{ g.l.}$$

Exercício 3



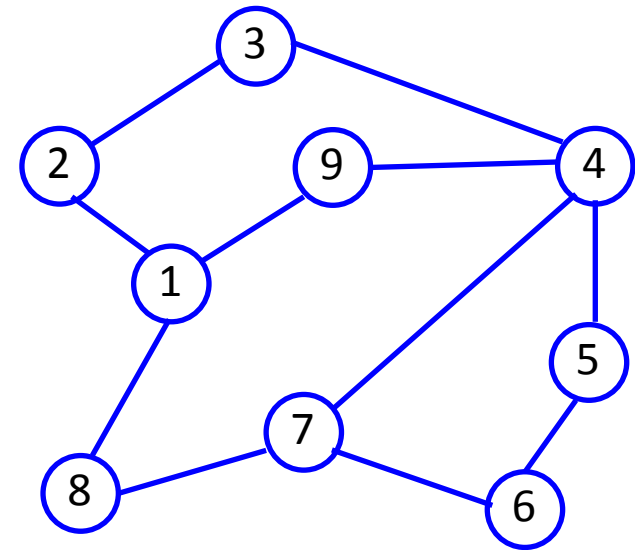
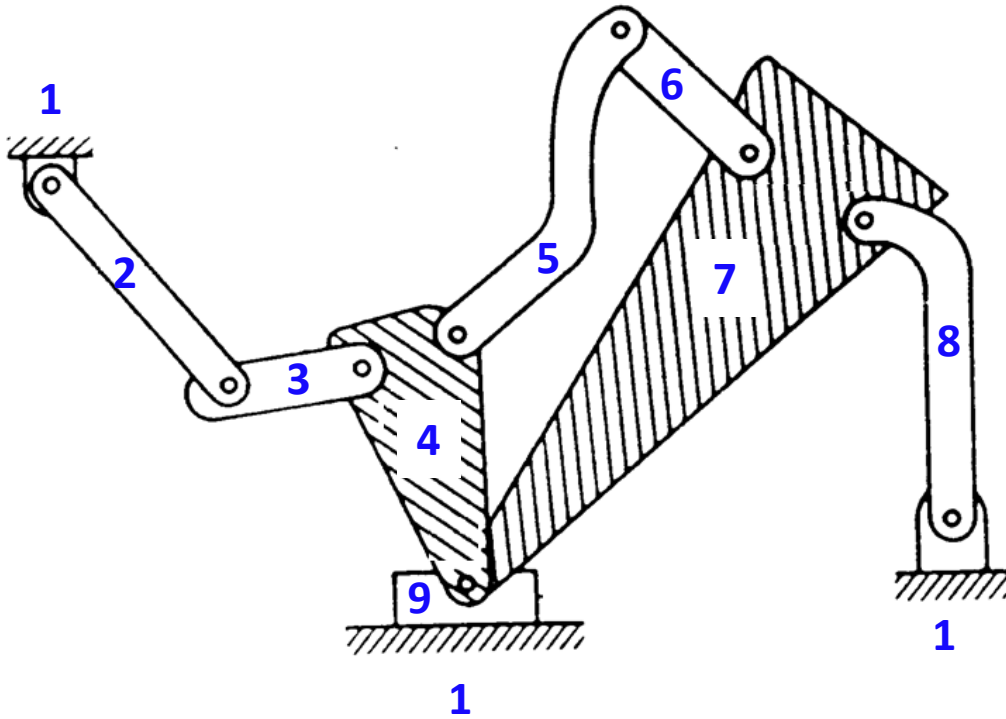
$$F = 3 \cdot (4 - 1) - 2 \cdot 4 - 0 = 1 \text{ g.l.}$$

Exercício 4



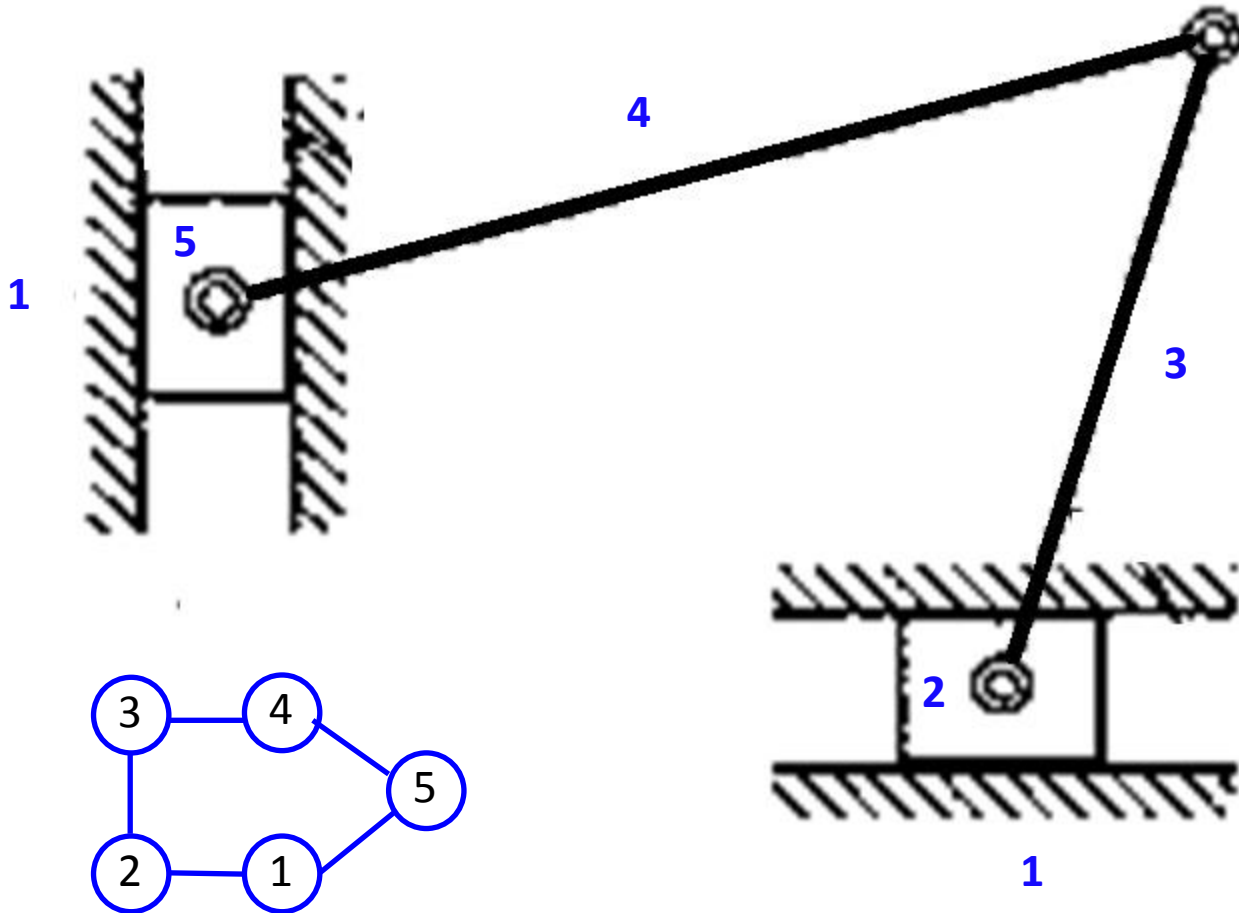
$$F = 3 \cdot (8 - 1) - 2 \cdot 8 - 1 = 4 \text{ g.l.}$$

Exercício 5



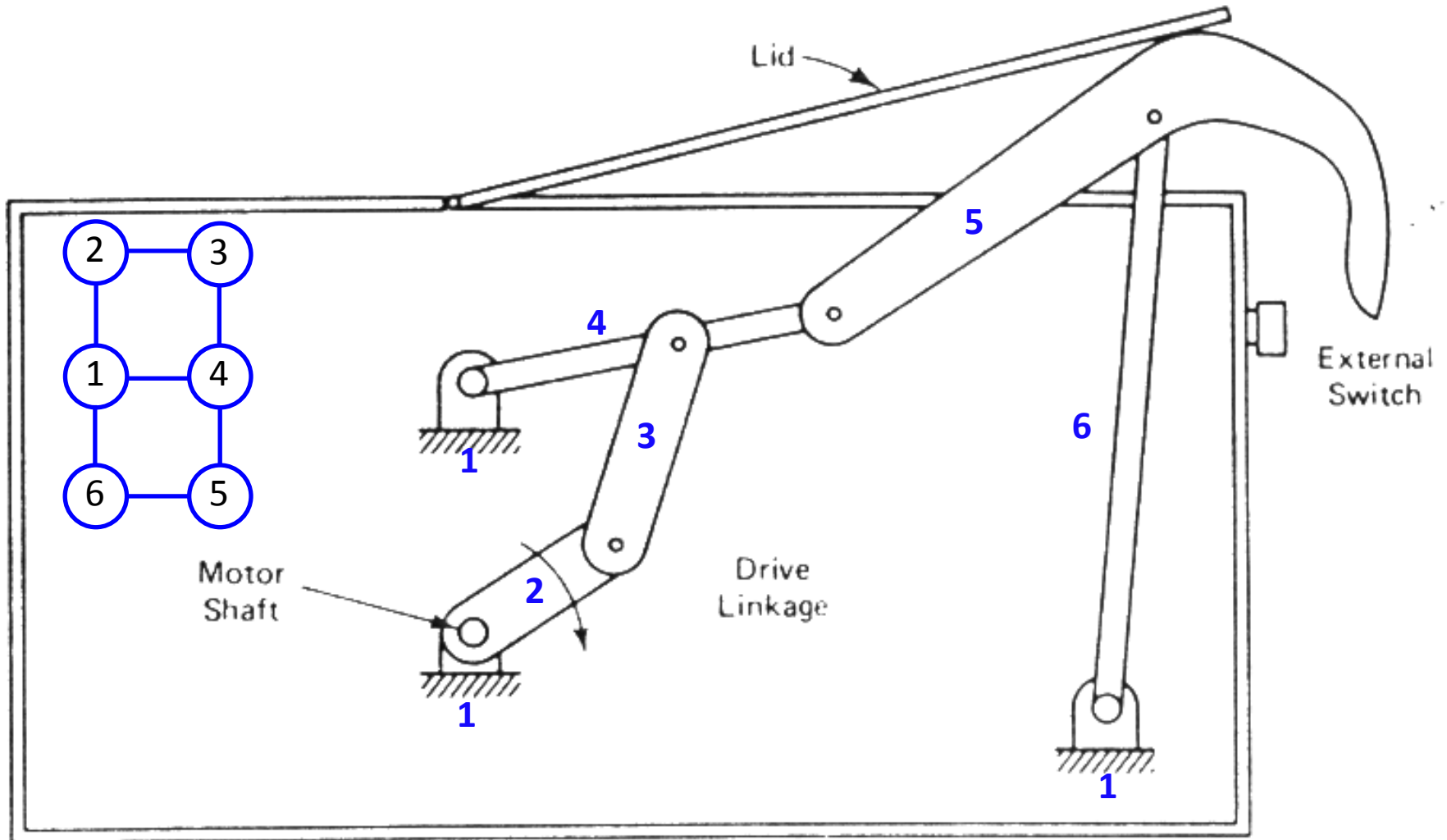
$$F = 3 \cdot (9 - 1) - 2 \cdot 11 - 0 = 2 \text{ g.l.}$$

Exercício 6



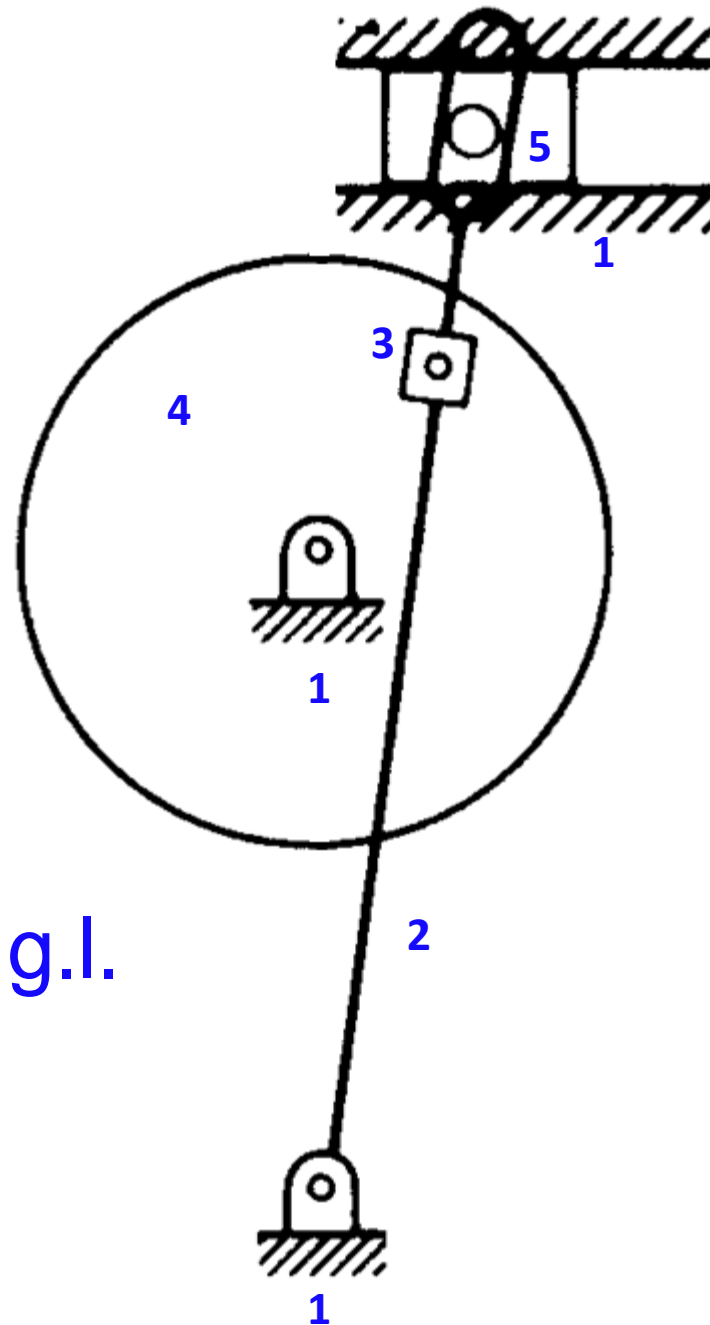
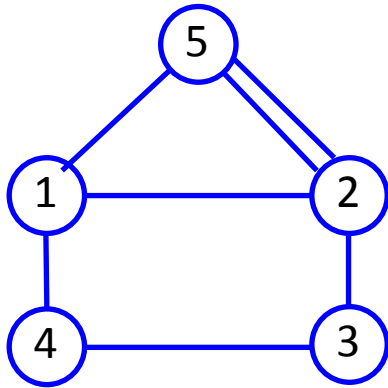
$$F = 3 \cdot (5 - 1) - 2 \cdot 5 - 0 = 2 \text{ g.l.}$$

Exercício 7



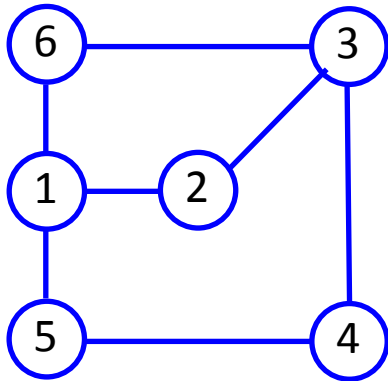
$$F = 3 \cdot (6 - 1) - 2 \cdot 7 - 0 = 1 \text{ g.l.}$$

Exercício 8

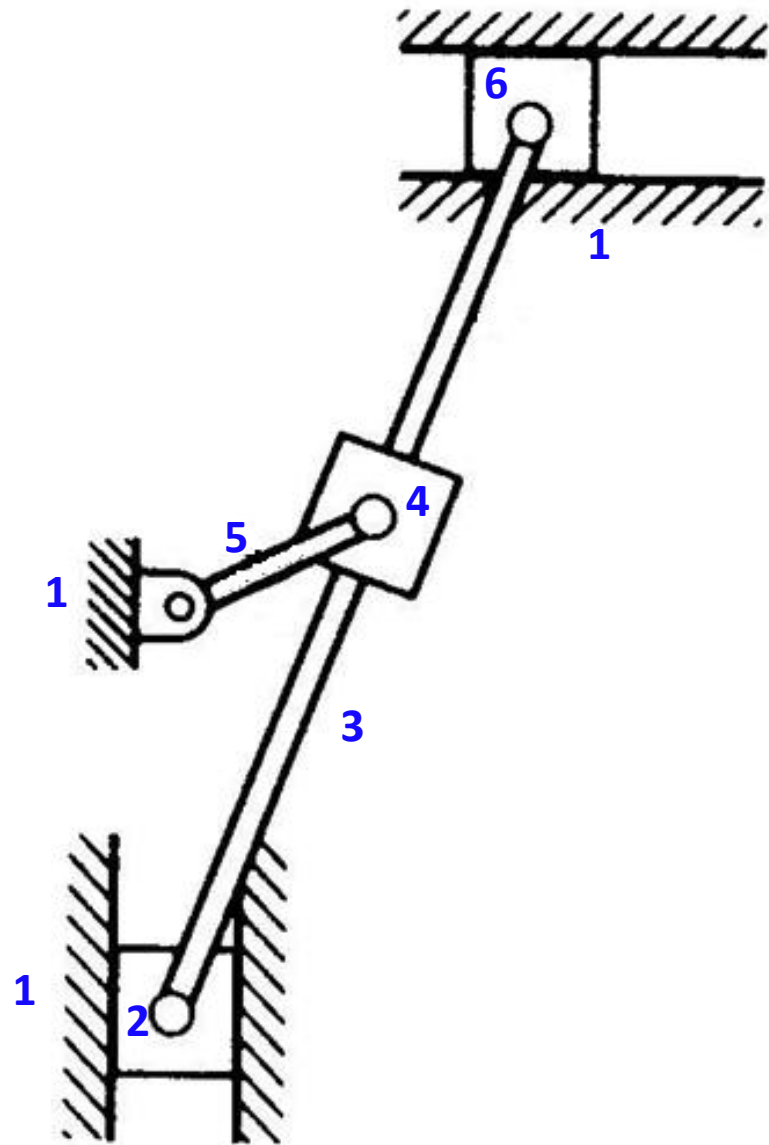


$$F = 3 \cdot (5 - 1) - 2 \cdot 5 - 1 = 1 \text{ g.l.}$$

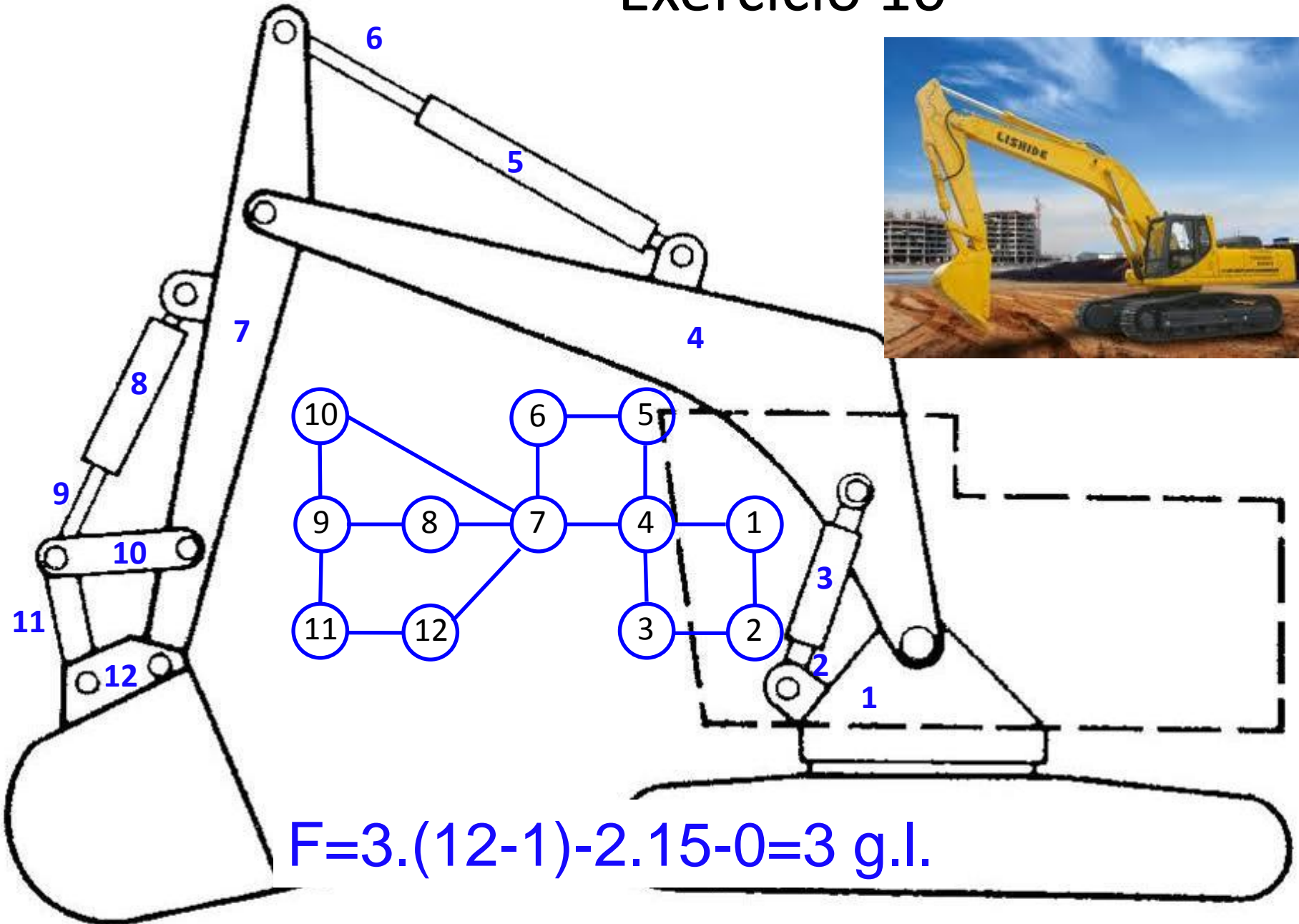
Exercício 9



$$F = 3 \cdot (6 - 1) - 2 \cdot 7 - 0 = 1 \text{ g.l.}$$

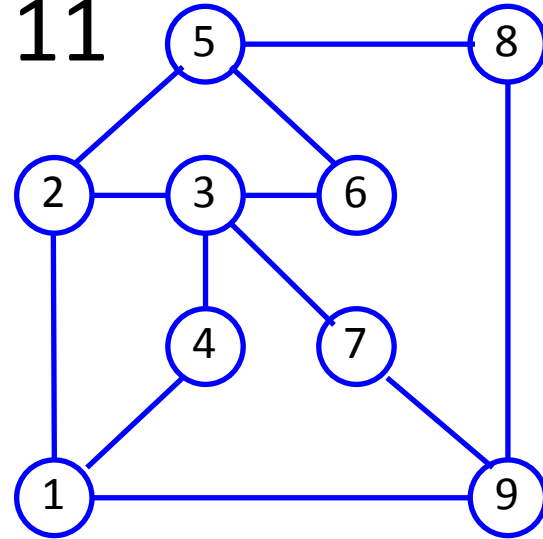
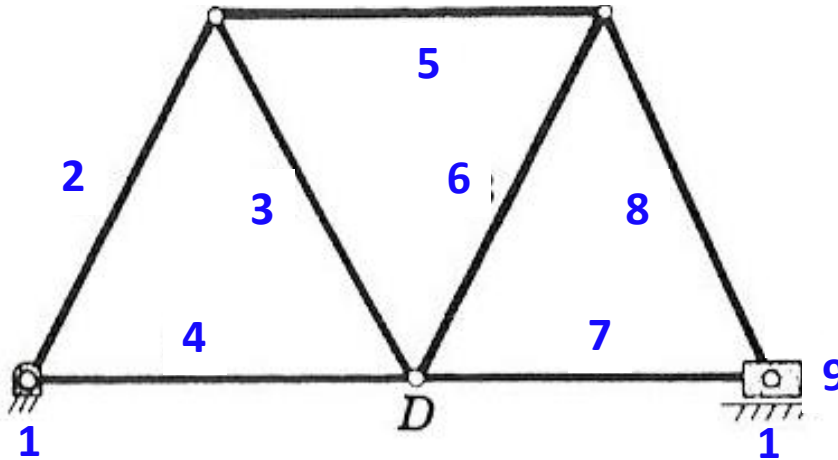


Exercício 10

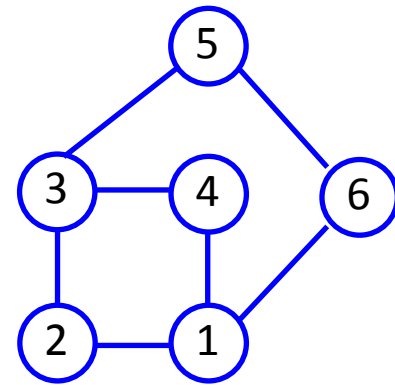
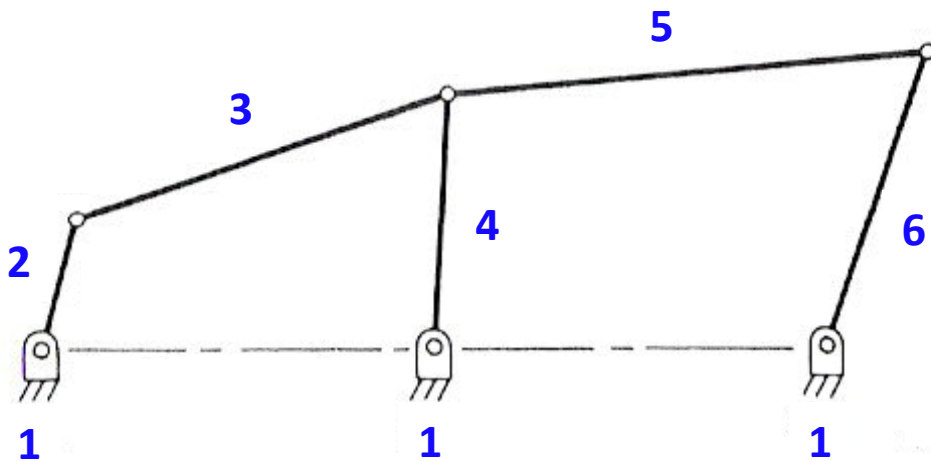


$$F = 3 \cdot (12 - 1) - 2 \cdot 15 - 0 = 3 \text{ g.l.}$$

Exercício 11



$$F = 3 \cdot (9 - 1) - 2 \cdot 12 - 0 = 0 \text{ g.l.}$$



$$F = 3 \cdot (6 - 1) - 2 \cdot 7 - 0 = 1 \text{ g.l.}$$