

Course No. CE 1023

Assignment No. 5

Date FEB 25, 2015

Page

1

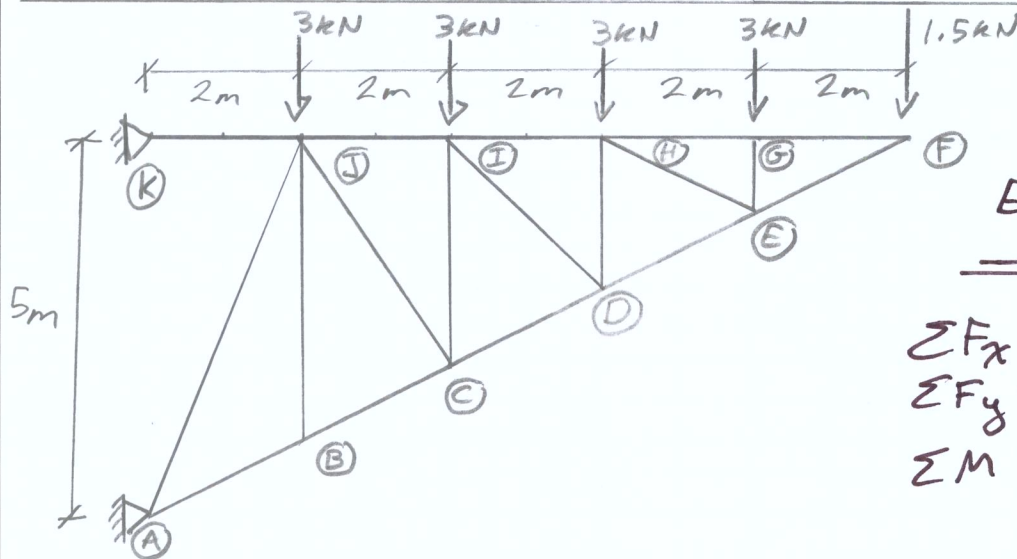
Problem No. 1

By ALAN LLOYD

of 4

FOR THE TRUSS BELOW, FIND

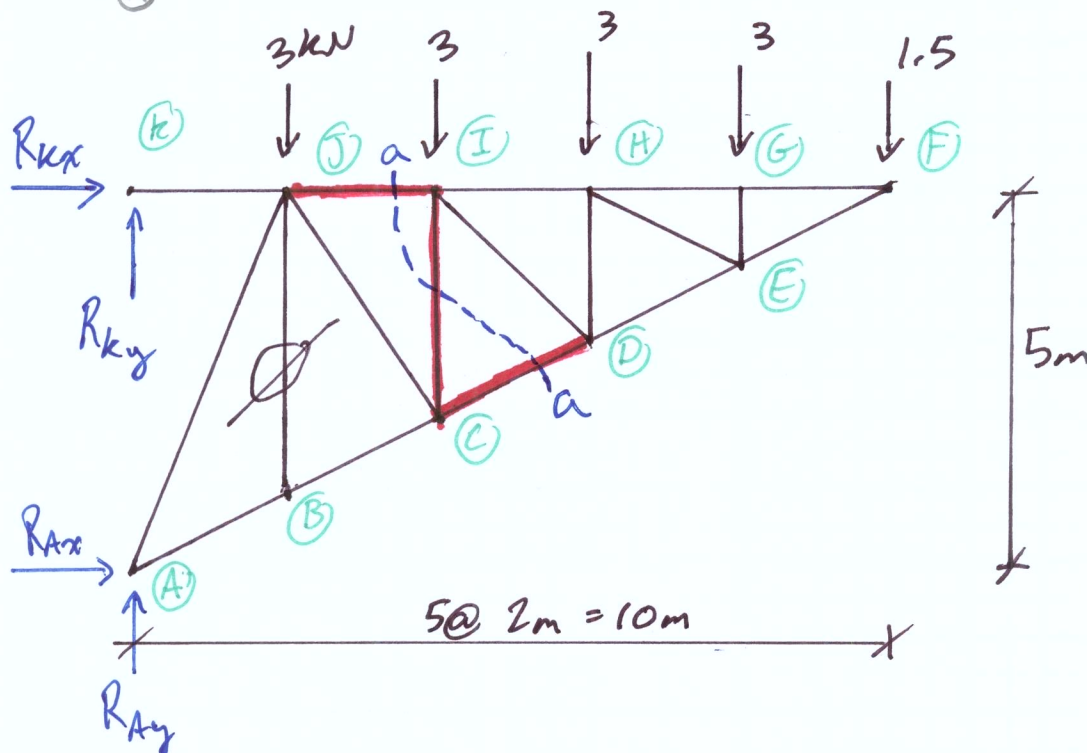
- SI (DETERMINACY)
- STABILITY
- ZERO-FORCE MEMBERS
- FORCE IN JI, IC, CD

Equations of Equilibrium

$$\sum F_x = 0$$

$$\sum F_y = 0$$

$$\sum M = 0$$



$$b = 18$$

$$r = 4$$

$$j = 11$$

$$a) \quad SI = b + r - 2j = 18 + 4 - 2(11) = 0$$

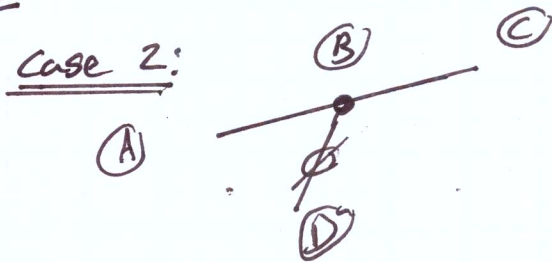
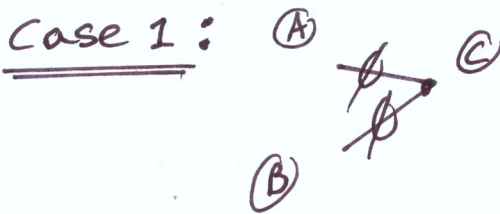
$$SI = 0$$

We have a determinate truss

b) Stable?

- Not all reactions are parallel or concurrent. ✓
 - $SI \geq 0$ ✓
 - No internal collapse mechanism ✓
- ∴ Stable ✓

c) Zero force members

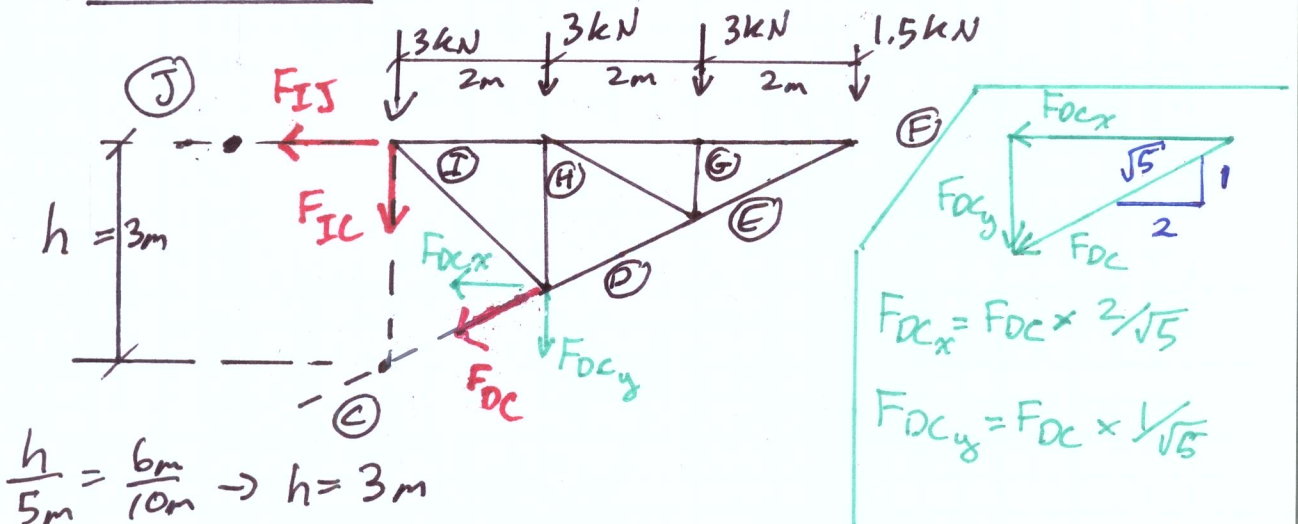


Joint	Member	Case
B	BJ	case 2

d) Find Forces in JI IC CD

- Cut through JI, IC, CD on path a-a

FBD of RHS



Course No. **CE1023**

Assignment No.

Date

Page

3

Problem No.

By **ALAN LLOYD**

of

4Apply Equilibrium

$$\sum M_C = 0 \rightarrow + F_{IJ}(3) - 3\text{kN}(2\text{m}) - 3(4) - 1.5(6) = 0$$

$$F_{IJ} = +9 \text{ kN (T)}$$

$$\sum F_x = 0 \rightarrow -F_{IJ} - F_{DCx} = 0$$

$$-9 - \left(\frac{2}{\sqrt{5}} F_{DC}\right) = 0$$

$$F_{DC} = -10.06 \text{ kN}$$

$$F_{DC} = 10.06 \text{ kN (C)}$$

$$\sum F_y = 0 \rightarrow -F_{IC} - 3 - 3 - 3 - 1.5 - F_{DCy} = 0$$

$$-F_{IC} - 10.5 - \left(-10.06 \times \frac{1}{\sqrt{5}}\right) = 0$$

$$\cancel{-F_{IC} - 10.5 + 4.501 = 0}$$

$$-F_{IC} - 10.5 + 4.499 = 0$$

$$F_{IC} = -6.00 \text{ kN}$$

$$F_{IC} = 6.00 \text{ kN (C)}$$

Summary Diagram

