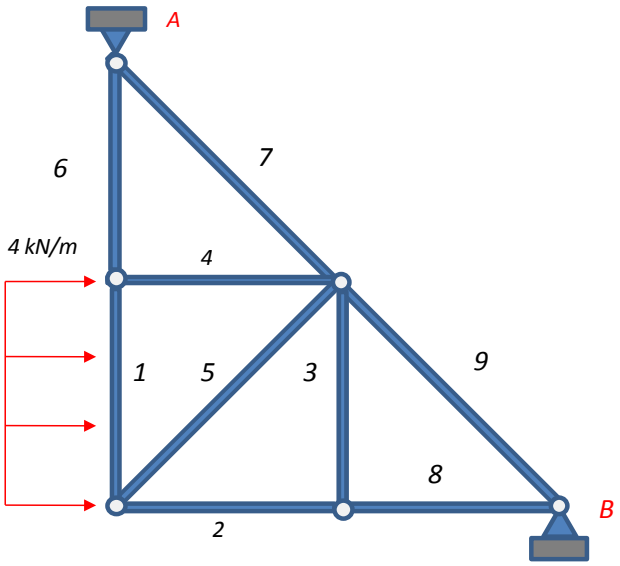
The truss shown in the figure, where all members measure 2 m, is loaded by a uniform continuous load of q = 4 kN/m in bar 1. Find the correct choice for the next questions.



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1. Global degree of static indeterminacy.

   a) DSI = 1

   b) DSI = 0

   c) DSI = -1

   d) DSI =2

---

2. The system of forces in member 4 can be replaced by two forces located in the nodes:

   a) 2 kN in A and 2 kN in B

   b) 1 kN in A and -1 kN in B

   c) 4 kN in A and 4 kN in B

   d) 4 kN in A and -2 kN in B

From this point till the end of the exercise, remove the vertical reaction force V_A

3. Which of the next elements cannot be removed in order to obtain a statically determined structure?

   a) H_a

   b) H_b

   c) Bar #3

   d) Bar #4

---

4. Horizontal reactions H_a and H_b.

   a) H_a = -2 kN; H_b =-6 kN

   a) H_a = -4 kN; H_b =-4 kN

   b) H_a = -5 kN; H_b = -3 kN

   c) H_a = -8 kN; H_b =0 kN

---

5. For the statically determined structure of the previous question, which of the members are not loaded?

   a) Bars 9 and 5

   b) Bars 5 and 2

   c) Bars 9 and 3

   d) Bars 4 and 5

---

6. Apply the method of the nodes at point A. Normal forces of bar 6 and 7 are:

   a) $N_6 = 2$ kN (T); $N_7 = 2\sqrt{2}$ kN (C)

   b) $N_6 = 2\sqrt{2}$ kN (C); $N_7 = 2$ kN (T)

   c) $N_6 = 2$ kN (C); $N_7 = 2\sqrt{2}$ kN (T)

   d) $N_6 = 2\sqrt{2}$ kN (T); $N_7 = 2$ kN (C)

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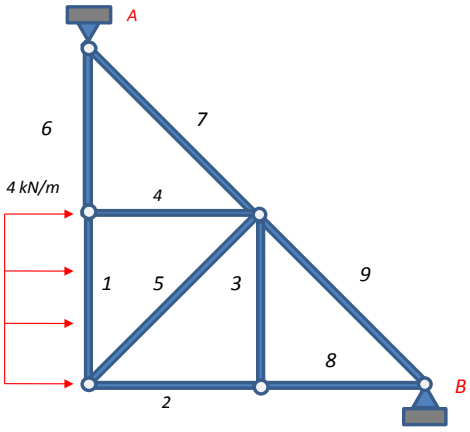
7. Determine all the internal forces and draw the force laws diagrams



1. DSI

$DSI = m + r - 2j = 9 + 4 - 2.6 = 1$

Where:

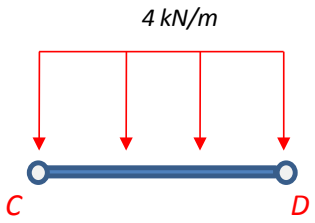
m: number of bars

r: number of reaction forces

j: number of joints

Then, the correct answer is a)

2. Equivalent system



$\sum M_D = 4.2.1 = 8\ kN.m$

$\sum M_D = 2V_c\ \ kN.m$

$2V_c = 8 \rightarrow V_c = 4\ kN$

$V_D = 8 - 2 = 4\ kN$

Then, the correct answer is b)

3. Removing elements.

In case of removing one of the horizontal reaction forces, the structure remains stable and DSI turn out to be equal to zero.

As it will be seen, internal force in bar #3 is equal to zero, therefore it can be removed and DSI turn out to be equal to zero

If bar #4 is removed there would not be equilibrium of horizontal forces in the node where the punctual load is applied. Consequently this bar cannot be removed.

Then the correct answer is d)

4. Reaction forces

From this point till the end of the exercise, remove the vertical reaction force V_A.

$\sum M_B = 4H_A + 4.2 = 0$

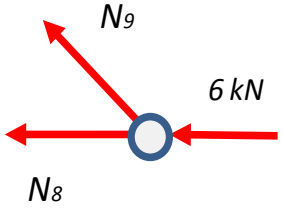
$\mathbf{H_A = -2\ kN}$

$\sum F_x = 0 \rightarrow \mathbf{H_B = -6\ kN}$

$\sum F_y = 0 \rightarrow \mathbf{V_B = 0\ kN}$

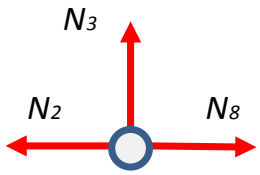
Then the correct answer is a)

5. Which of the members are not loaded?



$\sum F_x = 0 \rightarrow \mathbf{N_8 = 6\ kN\ (C)}$

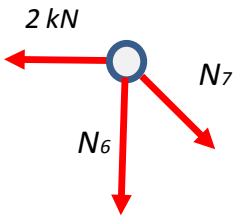
$\sum F_y = 0 \rightarrow \mathbf{N_9 = 0\ kN}$



$\sum F_y = 0 \rightarrow \mathbf{N_3 = 0\ kN}$

Then the correct answer is c)

6. Internal forces in 6 and 7



$\sum F_x = 0 \rightarrow N_7 \frac{\sqrt{2}}{2} - 2 = 0$

$\mathbf{N_7 = 2.\sqrt{2}\ kN\ (T)}$

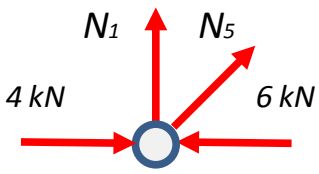
$\sum F_y = 0 \rightarrow N_6 + 2\sqrt{2}.\frac{\sqrt{2}}{2} = 0$

$\mathbf{N_6 = 2\ kN\ (C)}$

Then the correct answer is b)

7. Internal force diagram

$\sum F_x = 0 \rightarrow \mathbf{N_2 = 6\ kN\ (C)}$



$\sum F_x = 0 \rightarrow 4 - 6 + \frac{\sqrt{2}}{2} N_5 = 0$

$\mathbf{N_5 = 2.\sqrt{2}\ kN\ (T)}$

$\sum F_y = 0 \rightarrow \mathbf{N_1 = 2\ kN\ (C)}$