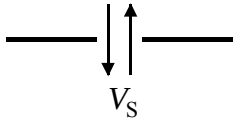
Remarks: See §5.2, page 162 till 168

Hints:

In a hinged connection work two components of the hinge-force.

- One in direction of the beam, but from horizontal equilibrium it follows that this component is always zero.
- The other component perpendicular to the beam, here called V_S

The positive directions:



When a load stands on a hinge the shear force on the left of the hinge is different from the shear force on the right of the hinge. $V_{S;left} \neq V_{S;right}$.

Answers: All forces in kN and moments in kNm

1. $A_h = 0$; $A_v = 2{,}5\ (\downarrow)$; $B_v = 7{,}5\ (\uparrow)$; $C_v = 5\ (\uparrow)$
   $V_S = +5$

2. $A_h = 0$; $A_v = 5\ (\downarrow)$; $B_v = 15\ (\uparrow)$; $C_v = 0$
   $V_{S;left} = +10$; $V_{S;right} = 0$

3. $A_h = 0$; $A_v = 3\ (\uparrow)$; $B_v = 11\ (\uparrow)$; $C_v = 4\ (\uparrow)$
   $V_S = +4$

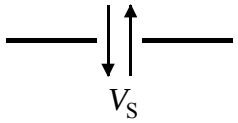
4. $A_h = 0$; $A_v = 8\ (\uparrow)$; $B_v = 0$; $C_v = 4\ (\uparrow)$
   $V_S = +4$

5. $A_h = 0$; $A_v = 12\ (\uparrow)$; $B_v = 8\ (\downarrow)$; $C_v = 8\ (\uparrow)$
   $V_S = +8$

6. $A_v = 5\ (\uparrow)$; $B_h = 0$; $B_v = 5\ (\uparrow)$; $B_m = 30\ (\circlearrowleft)$
   $V_S = -5$

See next page ▼

The positive direction for V_S :



7. $A_v = 30\ (\uparrow)\ ; B_h = 0\ ;\ B_v = 10\ (\uparrow)\ ;\ B_m = 20\ (\circlearrowleft)$
   $V_S = -10$

8. $A_h = 0\ ;\ A_v = 4\ (\uparrow)\ ;\ A_m = 16\ (\circlearrowleft)\ \ B_v = 6\ (\downarrow)\ ;\ C_v = 5\ (\uparrow)$
   $V_{S;1} = +4\ ;\ V_{S;2} = -2$

9. $A_v = 8\ (\uparrow)\ ;\ B_v = 16\ (\uparrow)\ ;\ C_h = 0\ ;\ C_v = 4\ (\downarrow)$
   $V_S = -12$

10. $A_h = 0\ ;\ A_v = 4\ (\uparrow)\ ;\ B_v = 12\ (\downarrow)\ ;\ C_v = 16\ (\uparrow)$
    $V_S = -8$

11. $A_h = 0\ ;\ A_v = 8\ (\uparrow)\ ;\ B_v = 24\ (\downarrow)\ ;\ C_v = 24\ (\uparrow)$
    $V_S = -16$

12. $A_v = 0\ ;\ B_h = 0\ ;\ B_v = 12{,}5\ (\uparrow)\ ;\ C_v = 2{,}5\ (\uparrow)$
    $V_{S;left} = 0\ ;\ V_{S;right} = -5$

13. $A_v = 2\ (\uparrow)\ ;\ B_h = 0\ ;\ B_v = 14\ (\uparrow)\ ;\ C_v = 0$
    $V_S = -6$

14. $A_v = 3\ (\downarrow)\ ;\ B_h = 0\ ;\ B_v = 10{,}5\ (\uparrow)\ ;\ C_v = 12{,}5\ (\uparrow)\ ;$
    $D_v = 5\ (\uparrow)$
    $V_{S;1} = +7{,}5\ ;\ V_{S;2} = -7{,}5$

15. $A_h = A_v = 0\ ;\ A_m = 15\ (\circlearrowleft)\ \ B_v = 10\ (\uparrow)$
    $V_S = -5$

16. $A_h = 0\ ;\ A_v = 17\ (\circlearrowleft)\ ;\ A_m = 15\ (\circlearrowleft)$
    $B_v = 5\ (\uparrow)$
    $V_{S;left} = +3\ ;\ V_{S;right} = +13$