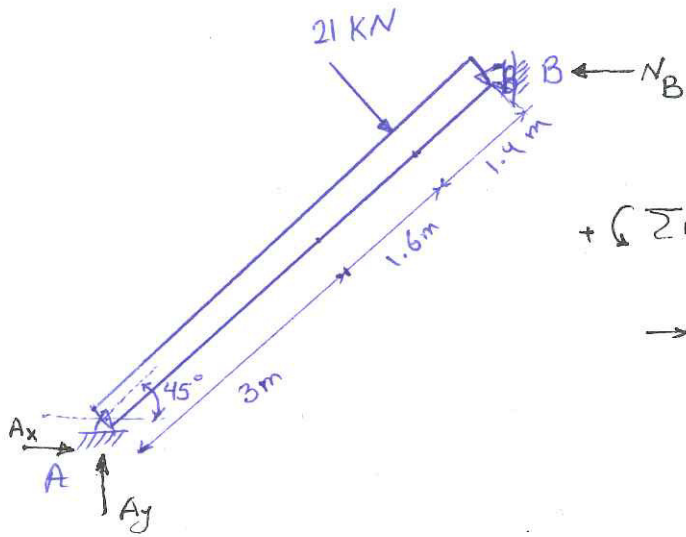


question 1)

EXam 01

ES-2502

Stress Analysis

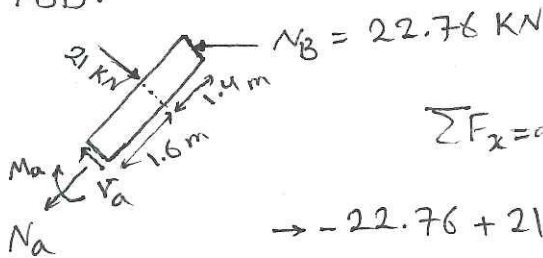


$$+\circlearrowleft \sum M_A = 0 \quad -21(3+1.6) + B_x(6 \sin 45) = 0$$

$$\rightarrow B_x = N_B = 22.76 \text{ kN}$$

for Section a-a  $\Rightarrow$

FBD:



$$\sum F_x = 0 \quad \text{①}$$

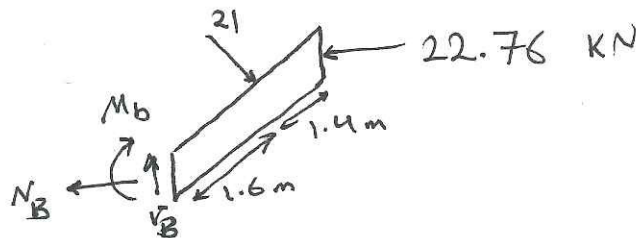
$$\rightarrow -22.76 + 21(\cos 45) - V_A \cos 45 - N_A \cos 45 = 0$$

$$\text{②} \quad \sum F_y = 0 \quad -N_A \cos 45 + V_A \sin 45 - 21 \sin 45 = 0$$

From Equations 1, 2  $\rightarrow$   $V_A = 4.9 \text{ kN}$  /  $N_A = -16.08 \text{ kN}$

$$+\circlearrowleft \sum M_A = 0 \rightarrow 21 \times 1.6 - 22.76(3 \sin 45) + M_A = 0 \rightarrow M_A = 14.68 \text{ kN.m}$$

for Section b-b:



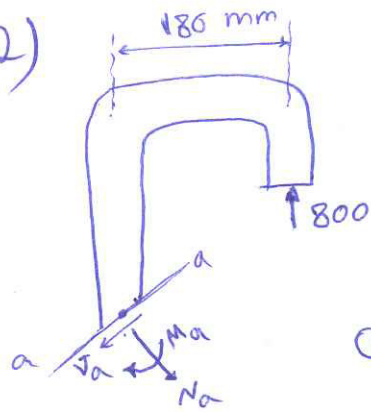
$$\sum F_x = 0 \rightarrow -22.76 + 21(\cos 45) - N_b = 0 \rightarrow N_b = -7.91$$

$$\sum F_y = 0 \rightarrow V_b - 21 \sin 45 = 0 \rightarrow V_b = 14.85 \text{ kN}$$

$$+\circlearrowleft \sum M_b = 0 \quad M_b + (21 \times 1.6) - 22.76(3 \sin 45) = 48.28 - 33.6 = 14.68$$

$$\rightarrow M_b = 14.68 \text{ kN.m}$$

question 2)



$$\textcircled{1} \quad \sum F_x = 0$$

$$V_a \times \cos 30 = N_a \sin 30$$

$$\rightarrow 0.866 V_a = 0.5 N_a \rightarrow N_a = \frac{0.866}{0.5} V_a$$

$$\textcircled{2} \quad \sum F_y = 0 \quad 800 - V_a \sin 30 - N_a \cos 30 = 0$$

From Equations 1, 2  $\rightarrow$   $V_A = 400 \text{ N}$

$N_A = 692.8 \text{ N}$

$$\sum M_A = 0 \rightarrow M_A = 800 \times 0.18 = \underline{144 \text{ N.m}}$$