Class Test # 3
Time ~~20 Mins~~ 25 min

Name:

Student Number:

1. The portion of truss shown in Fig. 1 represents the upper part of a power transmission line tower. For the given loading, determine the force in members BD, DE and EF by the method of section.

2. For the frame and loading shown in Fig. 2, determine the force acting on member ABC at point B and C.

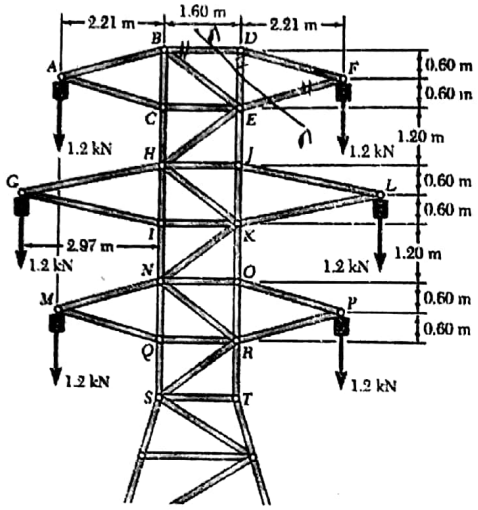


Fig. 1

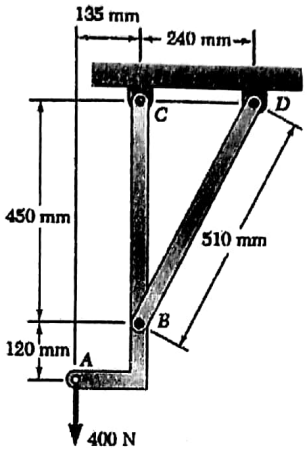
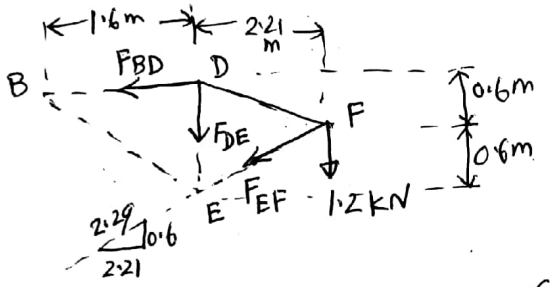


Fig. 2

Ans. to Q. NO. 1 The truss is sectioned by the cutting plane n-n and the FBD of the RHP is ~~considered~~ shown below.



$\circlearrowleft +\Sigma M_E = 0;\quad -1.2\times 2.21 + F_{BD}\times(0.6+0.6) = 0$

$F_{BD} = 2.21\ kN\ (T)$ Ans:

$\circlearrowleft +\Sigma M_D = 0;\quad -1.2\times 2.21 - F_{EF}\times\frac{0.6}{2.29}\times 2.21 - F_{EF}\times\frac{2.21}{2.29}\times 0.6 = 0$

$F_{EF} = -2.29\ kN \Rightarrow F_{EF} = 2.29\ kN\ (C)$ Ans:-

$\circlearrowleft +\Sigma M_F = 0;\quad F_{DE}\times 2.21 + F_{BD}\times 0.6 = 0$

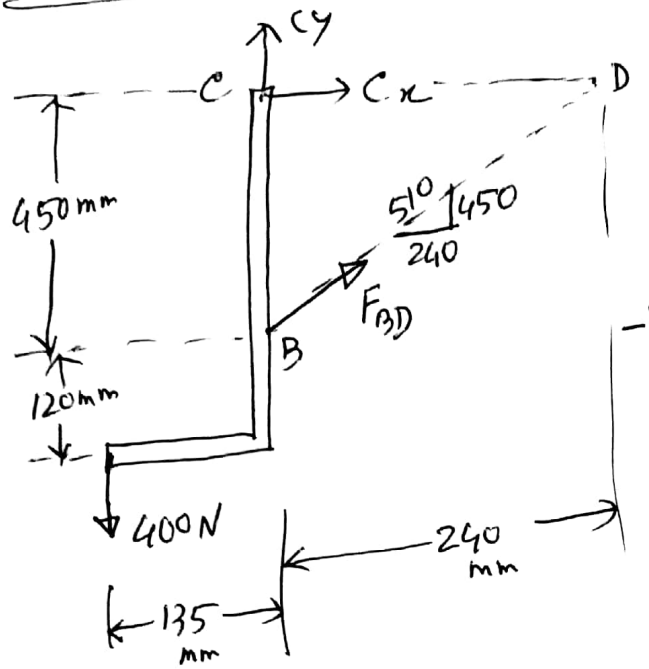
$\Rightarrow F_{DE} = -\frac{1}{2.21}\times F_{BD}\times 0.6 = -\frac{1}{2.21}(2.21)\times 0.6$

$F_{DE} = -0.6 \Rightarrow F_{DE} = 0.6\ kN\ (C)$ Ans:-

$F_{BD} = 2.21\ kN\ (T)$ $\quad F_{DE} = 0.6\ kN\ (C)$

$F_{EF} = 2.29\ kN\ (C)$ Ans:—

Ans. to Q. No. 2 FBD of member ABC is shown below-



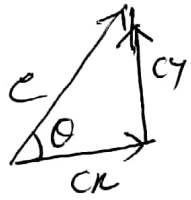
$\circlearrowleft + \Sigma M_D = 0$

$-C_y \times 240 + 400 \times (240 + 135) = 0$

$C_y = \boxed{625\ N \uparrow}$

$\circlearrowleft + \Sigma M_B = 0;$ $\quad -C_x \times 450 + 400 \times 135 = 0$

$C_x = \boxed{120\ N \rightarrow}$



$C = 636.42\ N$

79.13°

$\circlearrowleft + \Sigma M_C = 0;$ $\quad F_{BD} \times \frac{240}{510} \times 450 + 400 \times 135 = 0$

$F_{BD} = -255\ N$

$\boxed{F_{BD} = 255\ N\ (C)}$