

※ 考生請注意：本試題不可使用計算機。 請於答案卷(卡)作答，於本試題紙上作答者，不予計分。

1. Determine the magnitude of the gripping forces produced when two 300-N forces are applied as shown in Figure 1. (25 %)
2. The system shown in Figure 2 starts from rest, and each component moves with a constant acceleration. If the relative acceleration of block C with respect to collar B is 60 mm/s^2 upward and the relative acceleration of block D with respect to block A is 110 mm/s^2 downward, determine (a) the velocity of block C after 3 s, (b) the change in position of block D after 5 s. (25 %)
3. The three A-36 steel bars shown in Figure 3 are pin-connected to a rigid member. If the applied load on the member is 15 kN, determine the force developed in each bar. Bars AB and EF each have a cross-sectional area of 25 mm^2 , and bar CD has a cross-sectional area of 15 mm^2 . (25 %)
4. Determine the reactions on the beam shown in Figure 4. Due to the loading and poor construction, the roller support at B settles 12 mm. Take $E = 200 \text{ GPa}$ and $I = 80 (10^6) \text{ mm}^4$. (25 %)

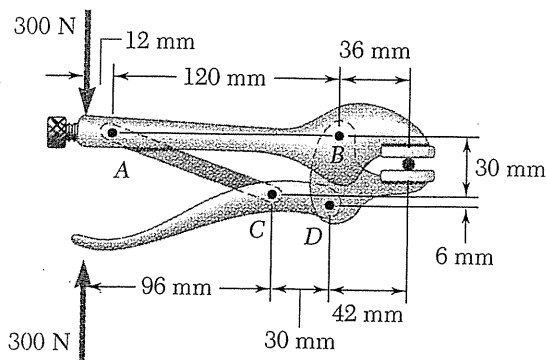


Figure 1

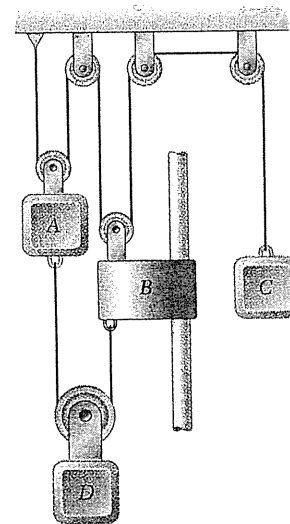


Figure 2

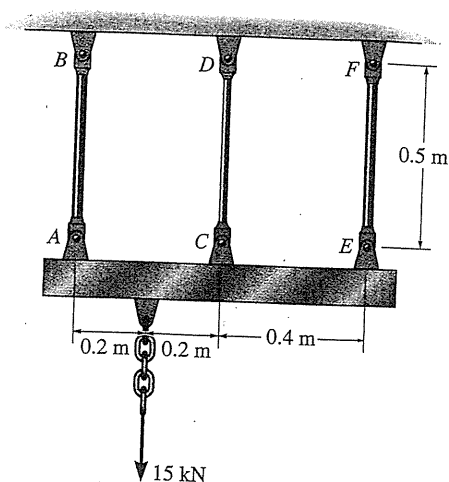


Figure 3

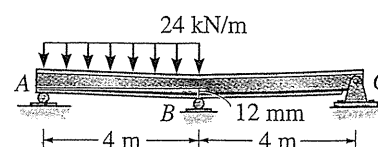


Figure 4