力学与航空航天工程系
DEPARTMENT OF MECHANICS AND AEROSPACE ENGINEERING

Deadline: 23:00pm of Wednesday (2022/06/01)
Please send your homework into TA's mailbox: 12132430@mail.sustech.edu.cn.

MECHANICS OF MATERIALS

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Problem 1

Determine the modulus of resilience for each of the following metals:

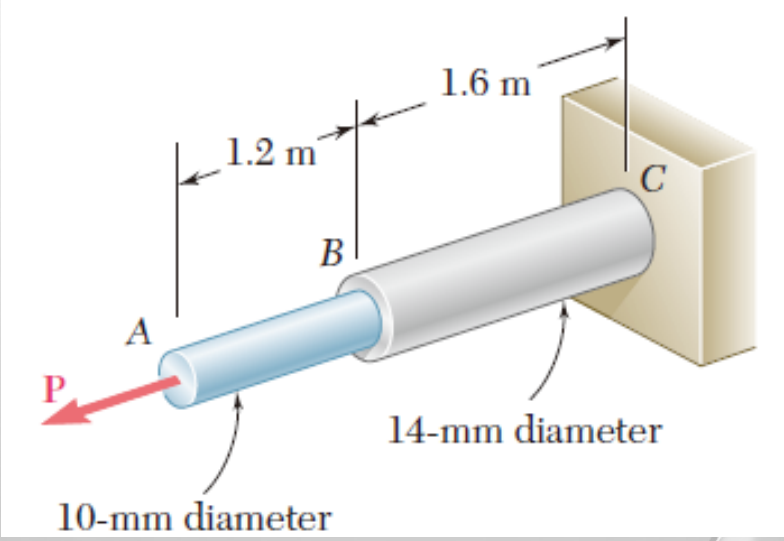
(*a*) Stainless steel
AISI 302 (annealed): $E = 190$ GPa $\sigma_Y = 260$ MPa

(*b*) Stainless steel 2014-T6
AISI 302 (cold-rolled): $E = 190$ GPa $\sigma_Y = 520$ MPa

(*c*) Malleable cast iron: $E = 165$ GPa $\sigma_Y = 230$ MPa

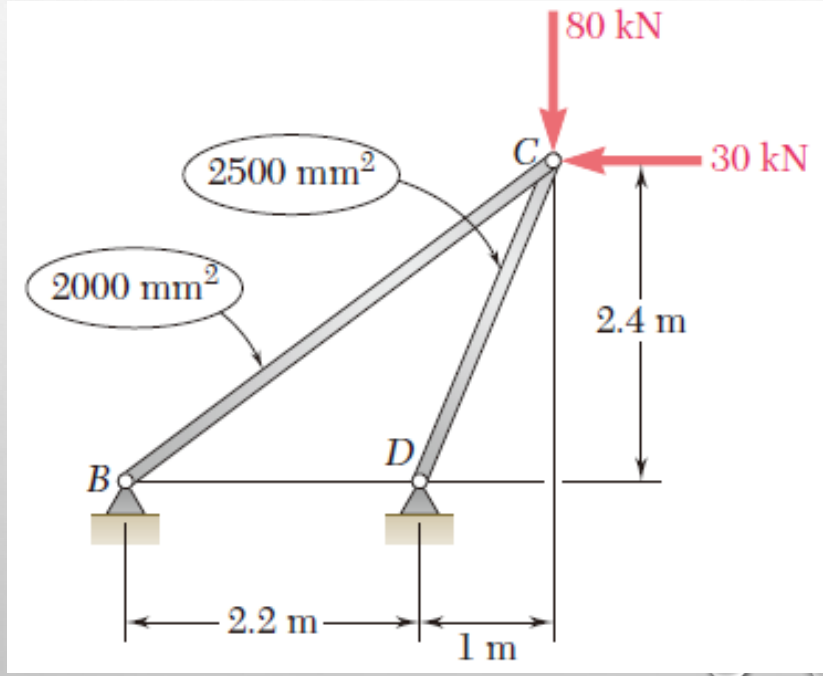
Problem 2

Rod AB is made of a steel for which the yield strength is $\sigma_Y = 450$ MPa and $E = 200$ GPa; rod BC is made of an aluminum alloy for which $\sigma_Y = 280$ MPa and $E = 73$ GPa. Determine the maximum strain energy that can be acquired by the composite rod ABC without causing any permanent deformations.



Problem 3

Each member of the truss shown is made of aluminum and has the cross-sectional area shown. Using $E = 72$ GPa, determine the strain energy of the truss for the loading shown.



Problem 4

11.24 through 11.27 Taking into account only the effect of normal stresses, determine the strain energy of the prismatic beam AB for the loading shown.

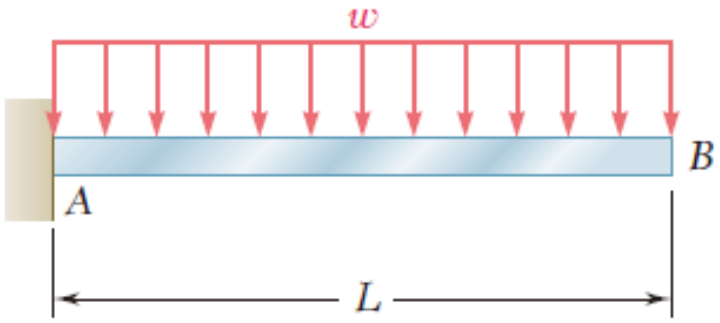


Fig. P11.24

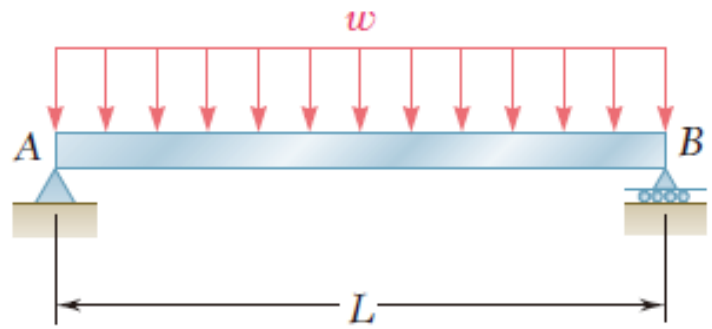


Fig. P11.25

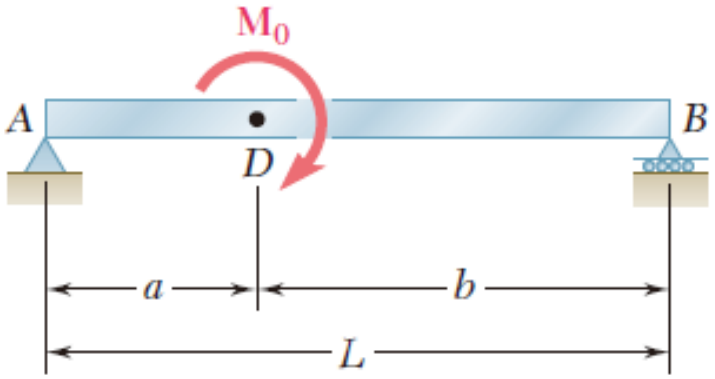


Fig. P11.26

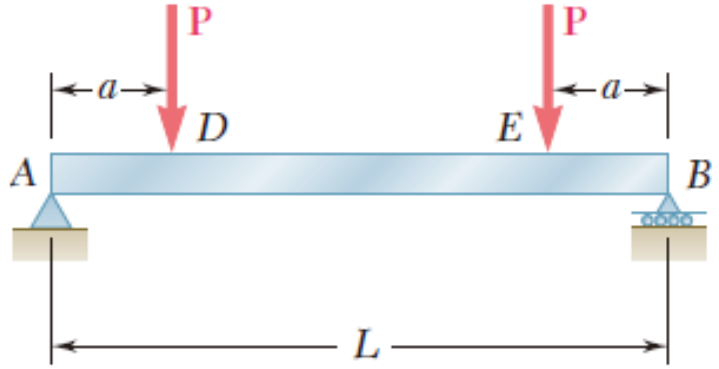


Fig. P11.27