

Question1

A bronze alloy with 120 mm length and a cross-sectional area of 325 mm^2 has an elastic modulus of 115 GPa. The stress at the beginning of plastic deformation begins is observed at 275 MPa.

- Determine how much the maximum load that the bronze alloy specimen can withstand without plastic deformation.
- Calculate the maximum length the bronze alloy specimen can be stretched without causing plastic deformation.

Question2

A cylindrical specimen of stainless steel (diameter of 12.8 mm, gauge length of 50.40 mm) is subjected to tension load. Answer part (a) through (b) using the load-elongation data tabulated in Table 1 below

Table 1

Load (N)	Length (mm)
0	50.40
1380	50.43
2780	50.46
5630	50.52
7430	50.60
8140	50.65
9870	51.14
12850	52.41
14100	53.68
14340	54.95
13830	56.22
12500	57.49
Fracture	

- Plot the stress-strain curve from the above data
- Compute the elastic modulus
- Determine the yield strength at a strain offset of 0.002
- Determine the appropriate ductility (% elongation)

Question 3

During tensile strength test for a bronze alloy, stress of 275 MPa was recorded at the beginning of plastic deformation, while the modulus of elasticity was recorded as 115Gpa.

- a) Determine the maximum load without plastic deformation that can be applied to the same bronze alloy material if the cross-sectional area of 325 mm^2 is given?
- b) Determine the maximum length that the bronze alloy specimen can be stretched without plastic deformation if its original length is given as 115 mm.