

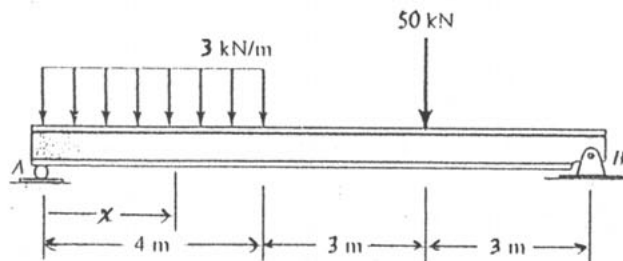
1. 試說明挫屈(buckling)的現象?(10%)

2. 請推導樑的剪應力公式 $\tau = \frac{VQ}{It}$ (20%)

推導公式時請列出所作的假設為何。

說明公式中各符號的意義。

3. Draw the moment and shear diagram for the beam in the figure.(6%) Determine the displacement at $x = 7$ m and the slope at A. EI is constant.(14%)



Figure

4. Define and explain the following terms: (a) allowable stress, (b) normal strain, (c) shear strain, (d) linear elastic. (20%)

5. A two-dimensional state of stress exists at a point on the free surface of a machine component. The remaining cartesian components of stress are $\sigma_{xx} = 45$ MPa, $\sigma_{yy} = 30$ MPa, and $\tau_{xy} = 20$ MPa. Determine (a) the three principal stresses, (b) the maximum shear stress in xy -plane, and (c) the absolute maximum shear stress and the associated (average) normal stress at the point. (30%)