1. Points –
   A - 0.01, 41
   B – 0.01, 41
   C - 0.06, 42
   D – 0.17, 60
   E – 0.26, 50

2. Equations
   Line OA - y = $\frac{1}{4100}x$

   Youngs modulus is the slope of the region from O to A and is therefore $\frac{1}{4100}$

   Line BC - y = $20x + 40.8$

   Line CD - y = $\frac{1800}{11}x + \frac{354}{11}$

   Line DE y = $\frac{-1000}{9}x + \frac{710}{9}$

3. List of variables –
   i) strain (float)
   ii) stress (float)

4. Sequence of Steps
   i) Create a variable called strain of float type, and ask the user to input the value of strain in the equation. This is will be the 'x' value of the coordinate.
   ii) Type an if statement to check if the value entered is between 0 and 0.01 and thus lies in the linear elastic region, i.e OA.
   iii) Create a variable called stress and use the equation above for line OA, with 'x' as the user inputted strain value, to solve for stress.
   iv) Print the stress value with a description of where it lies
   v) Type an if statement to check if the value entered is greater than 0.01 and less than 0.06 and thus lies in the plastic region, i.e BC.
   vi) Reassign a value to the variable called stress and use the equation above for line BC, with 'x' as the user inputted strain value, to solve for stress.
   vii) Print the stress value with a description of where it lies
   viii) Type an if statement to check if the value entered is greater than 0.06 and less than 0.17 and thus lies in the strain hardening region, i.e CD
   ix) Reassign a value to the variable called stress and use the equation above for line CD, with 'x' as the user inputted strain value, to solve for stress.
   x) Print the stress value with a description of where it lies

xi) Type an if statement to check if the value entered is greater than 0.17 and less than 0.26 and thus lies in the necking region, i.e DE

xii) Reassign a value to the variable called stress and use the equation above for line DE with 'x' as the user inputted strain value, to solve for stress.

xiii) Print the stress value with a description of where it lies

Test cases –

Linear elastic region -

1. Strain value – 0.01, Stress – 41 (Edge case)
2. Strain value – 0.0005, Stress – 1.219512195 x 10^-7 (Typical case)
3. Strain Value – 0.0045, Stress – 1.097560976 x 10^-6 (Typical case)
4. Strain Value – 0.0032, Stress – 7.804878049 x 10^-7 (Typical case)

Plastic region –

1. Strain value – 0.06, Stress – 42 (Edge case)
2. Strain value – 0.02, Stress – 41.2 (Typical case)
3. Strain Value – 0.03, Stress – 41.4 (Typical case)
4. Strain Value – 0.04, Stress – 41.6 (Typical case)

Strain hardening region –

1. Strain value – 0.17, Stress – 60 (Edge case)
2. Strain value – 0.08, Stress – 45.27272727 (Typical case)
3. Strain Value – 0.11, Stress – 50.18181818 (Typical case)
4. Strain Value – 0.15, Stress – 56.72727273 (Typical case)

Necking region –

1. Strain value – 0.26, Stress – 50 (Edge case)
2. Strain value – 0.18, Stress – 58.888888888888886 (Typical case)
3. Strain Value – 0.20, Stress – 56.66666666666666 (Typical case)
4. Strain Value – 0.24, Stress – 52.222222222222214 (Typical case)