

Description:

 The graph represents Stress v/s Strain curve for steel. Tensile test was conducted on a universal testing machine with steel as testing material. The values of deformation for different loads were tabulated. From the curve we can see that stress increases in proportion with strain up to a point called elastic limit.

Up to this limit, Hooke’s law holds good.

i.e stress α strain

 σ = E x ε



Description:

 The graph represents Beats Phenomenon. When two motions with slightly different frequencies get added this type of motion is observed.

Equation:

 X = x1 + x2 = a sinω1 t + b sinω2 t

 X = (a + b cosΔωt) sin ω 1t + (b sinΔωt) cosω 1t



Description:

 This graph represents Magnification v/s frequency ratio for different amounts of damping. It is also known as Frequency Response Curves. It can be seen that magnification is unity and independent of the damping at zero frequency. At resonance (ω=ωn), the amplitude of vibration becomes excessive for small damping and decreases with increase in damping. For zero damping at resonance the amplitude is infinite means practically the system may go into the destruction

Equation:

 $\frac{X}{Xst}=\frac{1}{\sqrt{\{[1-(ω/ωn)^{2}]^{2}+[2ζ(ω/ωn)]^{2}\}}}$



Description:

 The graph represents System response to step input for different amounts of damping. As the damping for the system increases the amplitude of vibrations go on decreasing.

Equation:

$x\left(t\right)=\frac{Fo}{k}\left[1-e^{-ζω\_{n}t}\left(cos\sqrt{1-ζ^{2}}ω\_{n}t+\frac{ζ}{\sqrt{1-ζ^{2}}}sin\sqrt{1-ζ^{2}}ω\_{n}t\right)\right]$



Description:

 The graph represents the distribution of radial and tangential stresses in a solid disc. From the graph it seen that radial and tangential stresses are maximum at the centre of disc. The radial stress is zero at the end of disc, but tangential stress has some positive value.

Equation:

$$σ\_{r}=\left(\frac{3+μ}{8}\right)ρω^{2}\left(b^{2}-r^{2}\right)$$

$$σ\_{θ}=\left(\frac{3+μ}{8}\right)ρω^{2}b^{2}-\left(\frac{1+3μ}{8}\right)ρω^{2}r^{2}$$



Description:

 The graph represents radial and tangential stress distribution in a disc with hole. From the graph it can be seen that radial stress is zero at inner and outer ends but varies in between. But tangential stress is maximum at inner section and minimum at outer section.

Equation:

 $σ\_{r}=\left(\frac{3+μ}{8}\right)ρω^{2}\left(a^{2}+b^{2}-\frac{a^{2}b^{2}}{r^{2}}-r^{2}\right)$

 $σ\_{θ}=\left(\frac{3+μ}{8}\right)ρω^{2}\left[a^{2}+b^{2}+\frac{a^{2}b^{2}}{r^{2}}-\left(\frac{1+3μ}{3+μ}\right)r^{2}\right]$



Description:

 This figure shows the nature of cardiod. This figure has been plot in polar co ordinates. The equation used for this curve is given as follows.

Equation:

 r = a ( 1 + cos θ )



Description:

 The graph represents the heat dissipation v/s outer radius. From the graph it is seen that heat dissipation increases rapidly up to certain radius and then decreases. The radius at which heat dissipation is maximum is called critical radius of insulation.

Application :

 For electrical wires: thickness < critical thickness ;

 For Boilers, refrigerators, etc: thickness > critical value

Equation:

$$Q=\frac{T\_{i}-T\_{\infty }}{\frac{ln\left(\frac{r\_{o}}{r\_{i}}\right)}{2πlk}+\frac{1}{2πlr\_{o}h}}$$



Description:

 The graph represents the relation between Energy & Degree of Reaction with Outlet blade angle. From the graph it is seen that for power producing turbomachines, β should be less than 26.5o. And degree of reaction is zero at outlet blade angle 153.5o.

Equation:

 $\frac{E}{m}=-2v\_{m\_{1}}^{2}\left(2-cotβ\_{2}\right)$

 $R=\frac{2+cotβ\_{2}}{4}$



Description:

 The graph represents variation of Head v/s Discharge for radial blades, acute angle blades. Head remains constant for all discharge values for radial blades. Head increases for blade angle greater than 90o , as discharge increases. And head decreases for blades with acute angle as discharge increases.

Equation:

 $H=\frac{u\_{2}^{2}}{gg\_{c}}-\frac{u\_{2}cotβ\_{2}}{πD\_{2}B\_{2}gg\_{c}}$