

- Q) According to Maximum shear stress theory $\tau_{\max} \rightarrow \frac{\sigma_y}{2FS}$
- Q) If d = diameter of the solid shaft and τ = permissible stress in shear for the shaft material, then torsional strength of the shaft is $\rightarrow \frac{\pi}{16} d^3 \tau$
- Q) The force required to punch a circular blank of 60mm diameter in a plate of 5mm thick is (take $\tau = 350$ MPa) \rightarrow **330 kN**
- Q) The ratio of linear stress to linear strain is called \rightarrow **Modulus of Elasticity**
- Q) Which is not a Mechanical Property of a material \rightarrow **Surface Roughness**
- Q) A localized compressive stress at the area of contact between two members is known as \rightarrow **Bearing Stress**
- Q) The algebraic difference between Maximum size to Minimum size is called \rightarrow **Tolerance**
- Q) In preferred numbers the series 1.00, 1.60, 2.50, 4.00 . called as \rightarrow **R5 Series**
- Q) Which is not an application of clearance fit \rightarrow **railway wheels shrunk on to axles**
- Q) If a machine member is subjected to a tensile stress (σ_t) due to direct load or bending load and a shear stress (τ) due to torsion, then the maximum shear stress induced in the member will be $\rightarrow \frac{1}{2} \left[\sqrt{\sigma_t^2 + 4\tau^2} \right]$
- Q) The ratio of ultimate stress to the design stress \rightarrow **Factor of safety**
- Q) According to Indian standards, total number of grades are \rightarrow **18**
- Q) Guest theory is applicable for following type of material \rightarrow **Ductile**
- Q) The material commonly used for machine tool bodies is \rightarrow **cast iron**
- Q) When the external force acting on a component tends to slide the adjacent planes with respect to each other, the resulting stresses on these planes are called \rightarrow **Shear Stress**
- Q) The property of a material which enables it to resist fracture due to high impact loads is known as \rightarrow **Toughness**
- Q) Rankines theory is applicable for following type of material \rightarrow **Brittle**
- Q) The material commonly used for crane hooks is \rightarrow **wrought iron**
- Q) In preferred numbers the series 1.00, 1.25, 1.60, 2.00 called as \rightarrow **R10 Series**
- Q) If a machine member is subjected to a tensile stress (σ_t) due to direct load or bending load and a shear stress (τ) due to torsion, then the maximum normal stress induced in the member will be $\rightarrow \frac{1}{2} \left[\sigma_t + \sqrt{\sigma_t^2 + 4\tau^2} \right]$
- Q) The ratio of lateral strain to linear strain is called \rightarrow **Poissons Ratio**
- Q) Hooks law holds good up to \rightarrow **proportional Limit**
- Q) When the material is loaded with in elastic limit, then the stress is \rightarrow **directly proportional to strain**
- Q) Maximum shear stress developed on the surface of a solid circular shaft under pure torsion is 240 MPa. if the shaft diameter is doubled, then the maximum shear stress developed corresponding to the same torque will be \rightarrow **30 MPa**
- Q) A machine member 50mm diameter, 250 mm long subjected to axial tensile load 235 kN. The yield strength of material is 480 MPa. The design factor of safety according to maximum shear stress theory \rightarrow **2**
- Q) A tension member of diameter d is designed with factor of safety of 3. if the load and the diameter are doubled, then factor of safety will be \rightarrow **doubled**
- Q) The algebraic difference between actual size to corresponding basic size is called \rightarrow **Deviation**
- Q) 18/8 steel contains \rightarrow **18 percent chromium and 8 percent nickel**

Q) A wrought Iron rod is under a compressive load of 350 kN. If the permissible stress for the material is 52.5 N/mm^2 . Find the diameter of the rod-->**92.13 mm**

Q) The rod of safety valve has a diameter 20mm and is subjected to a pressure of compressed air 0.8 MPa through a piston diameter 50mm. the stress induced in the material of the rod is-->**5 MPa**

Q) The strain energy stored in a body due to external loading with in elastic limit-->**Resilience**

Q) Steel containing up to 0.15% carbon is known as-->**dead mild steel**

Q) The principle stresses at a point consist of a tensile stress 200 MPa and compressive stress 100 MPa. The material yield strength is 500 MPa. The operating factor of safety according to maximum shear stress theory-->**3.33**

Q) A tension member of 40mm diameter is to be replaced by a square bar of the same material. The cross sectional side of the square member is-->**36 mm**

Q) The temperature at which the new grains are formed in the metal is called-->**recrystallisation temperature**

Q) The stress in the bar when load applied suddenly is _____ as compared to the stress induced due to gradually applied load-->**double**

Q) Distribution of stress on the cross section of a machine element subjected to axial tension or compressive force-->**is uniform**

Q) The metal suitable for bearings subjected to light loads-->**phosphor bronze**

Q) The process extensively used for making bolts and nuts is-->**cold heading**

Q) The strain energy stored in a body, when suddenly loaded is _____ the energy stored when same load is applied gradually-->**four times**

Q) When the percentage increase of carbon in steel decreases-->**ductility**

Q) In a unilateral system, the tolerance is allowed on-->**one side of the nominal size**

Q) The difference between the higher limit and the lower limit of size is called-->**Tolerance**

Q) The property of a material which enables it to resist fracture due to high impact load-->**Toughness**

Q) Stress concentration in static loading is more serious in-->**Brittle materials**

Q) The endurance limit of a material with finished surface in comparison to rough surface is-->**more**

Q) When a material is tested for endurance strength, it is subjected to-->**Cyclic Load**

Q) The stresses which vary from zero to a certain maximum value are called-->**Repeated Stress**

Q) A steel rod is subjected to a reversed load axial load of 180kN, if factor of safety is 2 and the material is having endurance strength of 535 MPa then the diameter of rod equal to-->**29.27mm**

Q) A rotating shaft carrying a uni-directional transverse load, is subjected to-->**Variable Bending Stress**

Q) A critical section at a point subjected bending moment causes a maximum stress of 55 MPa and the twisting moment causes a shear stress of 31.5 MPa. If the yield point is 284 MPa. The factor of safety according to maximum shear stress theory is-->**4.08**

Q) A crank pin of an engine sustains a maximum load of 35 kN due to gas bursting pressure. The design bearing pressure is 7 MPa and the length of the pin is equal to 1.2 times the diameter of the pin. Find the diameter of the pin-->**64.5 mm**

Q) The maximum stress due to stress concentration in a bar having circular transverse hole, as compared to its static stress without hole will be-->**3 times more**

Q) If σ_{\max} , σ_{\min} are the max stress and min stress in a member respectively, then the formula for variable stress is--> $\frac{\sigma_{\max} - \sigma_{\min}}{2}$

Q) Stress concentration in cyclic loading is more serious in-->**Ductile materials**

Q) Resistance to fatigue of a material is measured by-->**endurance limit**

Q) A machine component is subjected to stress which fluctuates between 300 MPa to -150 MPa. Find the ultimate strength according to Good man relation, if factor of safety is 2 and endurance strength = 0.5 ultimate strength-->**1050MPa**

Q) If a member subjected to completely reversed stress, then its mean stress is-->**zero**

Q) Endurance strength is 100% for a component with-->**mirror finish**

Q) According to Soderberg method, the factor of safety in variable loads obtained using the

relation--> $\frac{1}{FS} = \frac{\sigma_m}{\sigma_y} + \frac{\sigma_v}{\sigma_e}$

Q) A machine component is subjected to stress which fluctuates between 300 MPa to -150 MPa. Find the ultimate strength according to soderberg relation, if factor of safety is 2, $\sigma_e = 0.5 \sigma_u$ and $\sigma_y = 0.55 \sigma_u$ -->**1172 MPa**

Q) The stresses which vary from one value stress to same value of opposite stress are known as-->**Cyclic stress**

Q) The fatigue limit of a material-->**is greatly decreased by poor surface conditions**

Q) Stress concentration factor is the-->**ratio of maximum stress to the nominal stress**

Q) Endurance limit or fatigue limit is the maximum stress that a member can withstand for an infinite number of load applications without failure when subjected to-->**Completely reversed loading**

Q) The design stress for a component subjected to a completely reversible load is found by applying factor of safety to-->**endurance strength**

Q) Regarding fatigue strength which of the statement is incorrect-->**It can be increased by hot working**

Q) A material is said to fail under fatigue when it fails-->**below the elastic limit**

Q) The S-N curve for steel becomes asymptotic nearly at--> **10^6 cycles**

Q) According to Goodman method, the factor of safety in variable loads obtained using the

relation--> $\frac{1}{FS} = \frac{\sigma_m}{\sigma_u} + \frac{\sigma_v}{\sigma_e}$

Q) a leaf spring in an automobile is subjected cyclic stress of mean stress = 150MPa, variable stress = 50 MPa. The spring is made by material with yield stress 350 MPa and endurance limit = 150 MPa. Find the factor of safety by soderberg method-->**1.3**

Q) A circular bar of 500 mm length is supported freely at its ends. It is acted upon by a central concentrated cyclic load having a minimum value of 20 kN and a maximum value of 50 kN. Find the Mean and variable Bending moment-->**4375 Nm, 1875 Nm**

Q) The fatigue life of a part can be improved by-->**shot peening**

Q) Finite life of machine member is generally as--> **10^3 cycles**

Q) A machine part has varying cross section with fillets, increase in the radius of fillets-->**reduces the stress concentration factor**

Q) In a fatigue testing machine if the size of a standard specimen is increased, the endurance limit for the material will-->**decreases**

Q) the design component of ductile material under variable loading, stress concentration factor is applied to-->**variable stress only**

Q) The maximum value of stress concentration factor in an infinite plate with a circular hole under uniaxial tension load is-->**3**

Q) Infinite life of machine member is generally as-->**10⁶ cycles**

Q) Cold working-->**increase the fatigue strength**

Q) If σ_{max} , σ_{min} are the max stress and min stress in a member respectively, then the formula

for mean stress is--> $\frac{\sigma_{max} + \sigma_{min}}{2}$

Q) The residual compressive stress by way of surface treatment of a machine member subjected to fatigue loading to-->**improves the fatigue life**

Q) The stress which varies from minimum value to maximum value of the same nature-->**Fluctuating stress**

Q) A simply supported shaft between bearings carries a steady load of 10 kN at the center. The length of shaft between bearings is 450mm. if endurance limit = 600 MPa, surface finish factor = 0.87, size factor = 0.85 and factor of safety = 1.6. find the minimum diameter of the shaft-->**35 mm**

Q) The stress which varies from minimum value to maximum value of the opposite nature-->**Alternating stress**

Q) Fatigue stress concentration factor is the ratio between-->**Endurance limit without stress concentration to endurance limit with stress concentration**

Q) According to Gerber method, the factor of safety in variable loads obtained using the

relation--> $\frac{1}{FS} = \left(\frac{\sigma_m}{\sigma_u}\right)^2 FS + \frac{\sigma_v}{\sigma_e}$

Q) A member tested under variable loading whose ultimate stress and endurance limit of the shaft material is 400 MPa and 200 MPa respectively. The endurance strength of the member for a life of 10⁵ cycle is-->**243 MPa**

Q) A steel connecting rod is subjected to a completely reverse axial load of 100kN. For the material endurance limit = 550 MPa, load factor = 0.85, size factor = 0.85, surface finish factor = 0.76. what is the suitable size of the rod, if factor of safety is 2-->**30 mm**

Q) The yield point in static loading is _____ as compared to fatigue loading-->**Higher**

Q) Bending stress in a machine component fluctuates between a tensile stress of 280 MPa and compressive stress of 140 MPa. The factor of safety is 1.7, the yield strength and endurance strength 55%, 50% of ultimate tensile strength respectively. What should be the minimum ultimate tensile strength according to soderberg criterion-->**788 MPa**

Q) Which of the following as a permanent fastening-->**rivets**

Q) a 50 mm diameter shaft made from carbon steel subjected to a torque which fluctuates between 2 kN-m to -0.8 kN-m. what is the factor of safety according to soderberg method (take yield strength = 225 MPa, endurance strength = 150 MPa)-->**2**

Q) Soderberg and goodman equations are concerned with the safety factors in case of-->**variable stress**

Q) The relation between notch sensitivity factor (q), theoretical stress concentration factor

(K_t) and fatigue stress concentration factor (K_f) is given by--> $q = \frac{K_f - 1}{K_t - 1}$

Q) If a member subjected to completely reversed stress, then its variable stress is-->**magnitude of stress**

Q) A shaft transmits torque varying from 1200 Nm to 800 Nm. The mean and variable torque are-->**1000 Nm, 200 Nm**

Q) The number of bolts required to couple the flanges of a coupling depends upon-->**diameter of the shaft**

Q) A screw is specified by its-->**major diameter**

Q) Pre loading is essential in the bolts of-->**Pressure vessels**

Q) In a lozenge joint the width of the plates is 200mm, the diameter of the rivet hole is 20mm. the efficiency of the section having one rivet hole is-->**90%**

Q) According to Indian boiler regulations, for double shear, the shear strength of a rivet may

be taken equal to--> $1.875 \frac{\pi}{4} d^2$

Q) Transverse fillet welded joints are designed for-->**tensile strength**

Q) A tap bolt-->**has a head at one end and other end fits into a tapped hole in the other part to be joined**

Q) In a fillet welded joint which is the weakest plane-->**The throat of the weld**

Q) A plate of 100mm width and 12mm thick is to be welded to another plate by means of fillet weld. The size of the weld is 8mm. the joint is subjected to a load of 80kN. The total length of the weld, if the permissible shear stress in the weld not to exceed 50Mpa is-->**250.55mm**

Q) Efficiency of a riveted joint is the ratio between-->**Minimum of P_t , P_s , P_c to Strength of Solid Plate**

Q) The thread which is suitable for power transmission in either direction is-->**Square**

Q) The cap of connecting rod end is secured by two bolts. If the maximum pull in the connecting rod is 60 kN, proof strength of bolt material is 90 N/mm², $d_c = 0.84d$ and factor of safety is 3. The diameter of bolt is-->**42.48 mm**

Q) In order to avoid tearing of the plate at edge, the distance from the center line of the rivet hole to the nearest edge of the plate in terms of diameter of rivet d should be-->**1.5d**

Q) The center to center distance between two consecutive rivets in a row is called-->**pitch**

Q) Rivet in the lap joint always subjected to-->**single shear**

Q) The center to center distance between two consecutive rows in a riveted joint is called-->**back pitch**

Q) Two machine parts are fastened together tightly by means of a M24 tap bolt. Find the stress that is setup in the bolt due to initial tightening (take core dia = 20.32mm)-->**210.18 MPa**

Q) The included angle in acme thread is-->**29°**

Q) An allen bolt is-->**provided with hexagonal depression in head**

Q) Machine screws are-->**slotted for screw driver and generally used with a nut**

Q) The head of pneumatic cylinder with bore 250 mm is fastened by eight steel bolts (yield strength = 300 MPa) Maximum pressure inside the cylinder is 1.2 MPa. The factor of safety is to be 5. The root area of bolt in mm²-->**122.7**

Q) The function of washer is to-->**providing bearing area**

Q) The diameter of hole must be drilled in a M48 bolt such that the bolt becomes uniform strength is (when core diameter is 41.795mm)-->**23.6 mm**

Q) Eye bolts are used for-->**lifting and transportation of machines**

Q) If the tearing efficiency of a riveted joint is 75% then the ratio of diameter of rivet to the pitch is equal to-->**0.25**

Q) Parallel fillet welded joints are designed for-->**shear strength**

Q) The size of the weld in butt weld is equal to--> **Plate thickness**

Q) A Stud-->**has both ends threaded**

Q) The permissible shear stress in a fillet weld is 100 N/mm². The size of the weld is 15mm.

The allowable shear load on weldment per mm length is-->**1060.5N**

Q) Set screws are-->**used to prevent relative motion between parts**

Q) For a double start threaded bolt, if the pitch value is 2.4mm, then the axial distance travelled by the bolt for two revolutions is-->**9.6 mm**

Q) When a nut is tightened by placing a washer below it, the bolt is subjected to-->**tensile stress**

Q) Rivets are generally specified by-->**shank diameter**

Q) A line joining the centers of rivets and parallel to the edge of the plate is known as-->**margin**

Q) In the eccentrically loaded riveted joint, the eccentric load is 100N and the number of rivets are 4, the primary shear load on each rivet is-->**25N**

Q) The longitudinal joint in boilers is used to get the required-->**diameter of boiler**

Q) Caulking and fullering are the operations performed on a riveted joint to make the joint-->**Leak proof**

Q) According to Unwins formula, the relation between diameter of rivet hole (d) and thickness of plate (t) is given by--> **$d = 6\sqrt{t}$**

Q) A screw thread is specified by M8 X 1.25. the number 8 indicates-->**nominal diameter**

Q) The spindle of bench vices are usually provided with-->**buttress threads**

Q) The initial tension of M20 bolt is-->**56800N**

Q) Eight bolts are to be selected for fixing the cover plate of a cylinder subjected to a maximum load of 980.175 kN. The design stress for the bolt material is 315 MPa, what is the diameter of each bolt-->**22 mm**

Q) The load carrying capacity of a bolt of 7mm core diameter with tensile stress 40 N/mm² is-->**1539.38 N**

Q) Two shafts of each 50mm diameter are connected by a flange coupling with 4 bolts on a 200mm bolt hole circle. The maximum shear strength of bolts is 70 N/mm², if torque transmitted by shaft is 1500 Nm. The diameter of bolt is-->**8.25 mm**

Q) The screw thread commonly used for transmission of motion is one of the following thread-->**Acme**

Q) The shock absorbing capacity of a bolt is increased by-->**making shank diameter equal to core diameter of thread**

Q) A cylindrical rod of 50mm diameter is welded to a flat plate by an all round circumferential weld. A force of 10 kN is acting on the rod at a distance 200mm from the welded end. The size of the weld is 20mm. the section modulus is 27750 mm³. The shear stress in the fillet weld is-->**4.5 MPa**

Q) A bolt-->**has a head at one end and a nut fitted to the other**

Q) The included angle in unified or American national thread is-->**60°**