

Q)The axis of spin, precession and gyroscopic couple are contained in--> **Three mutually perpendicular axes**

Q)An aero plane is in space, let the propeller be rotating in clock-wise direction when viewed from the rear end. Now the aero plane is taking a right turn. The active gyroscopic couple tends to--> **raise the nose and lower the tail**

Q)The magnitude of angular velocity of rotating body is specified by--> **length of vector**

Q)The active gyroscopic couple is represented by ω_p = angular velocity of precession ω = angular velocity of precession--> **$I \omega \omega_p$**

Q)The gyroscopic acceleration is given by--> **$\omega \delta\theta/\delta t$**

Q)The total reaction of ground on the wheels of a vehicle due to gyroscopic couple and centrifugal force while negotiating curve is--> **increased on outer wheels and decreased on inner wheels**

Q)The gyroscopic couple is introduced in a ship whose spin axis is parallel to star board, when it is--> **pitching**

Q)When a ship travels in sea, which of the following effects is more dangerous--> **pitching**

Q)An aero plane is in space, let the propeller be rotating in clock-wise direction when viewed from the rear end. Now the aero plane is taking a right turn. The reactive gyroscopic couple tends to--> **raise the tail and lower the nose**

Q)An aero plane is in space; let the propeller be rotating in counter clock-wise direction when viewed from the rear end. Now the aero plane is taking a right turn. The active gyroscopic couple tends to--> **raise the tail and lower the nose**

Q)An aeroplane is in space, let the propeller be rotating in clock-wise direction when viewed from the rear end. Now the aeroplane is taking a right turn. The reactive gyroscopic couple tends to--> **raise the nose and lower the tail**

Q)Steering of a ship means--> **turning of a complete ship in a curve towards right or left, while it moves forward**

Q)The rotor of a ship rotates in clockwise direction when viewed from the stern and the ship takes a left turn. the effect of gyroscopic couple acting on it will be--> **to raise the bow and lower the stern**

Q)In order to reduce the total gyroscopic effect on a four wheeler while taking a turn, the engine must be provided with a flywheel which should rotate in _____ direction to that of wheels--> **opposite**

Q)The gyroscopic effect in a four wheeler due to rotating parts of the engine, like flywheel is--> **$I_e * \omega_e * \omega_p$**

Q)The gyroscopic effect in a four wheeler due to four wheels is--> **$I_w * \omega_w * \omega_p$**

Q)A motor car moving at a certain speed takes a left turn in a curved path. If the engine rotates in the same direction as that of wheels, then due to centrifugal force--> **The reaction on inner wheels increases and on outer wheels decreases**

Q)For a two force member to be in equilibrium which of the following conditions has to be satisfied--> **All the above**

Q)A motor car moving at a certain speed takes a left turn in a curved path. If the engine rotates in the same direction as that of wheels, then due to centrifugal force--> **The reaction on inner wheels decreases and on outer wheels increases**

Q)When the pitching of the ship is upwards, the effect of gyroscopic couple acting on it will be--

> to move the ship towards star-board

Q)The pitching of the ship produces forces on the bearings which act _____ to the motion of the ship--> **horizontally and perpendicular**

Q)D'Alembert's principle states that--> **Inertia forces, applied forces, inertia torque and applied torque keep the body in dynamic equilibrium**

Q)Pair of action and reaction forces acting on a body is known as--> **constraint forces**

Q)For a member subjected to four or more forces, to be in equilibrium which of the following conditions has to be satisfied--> **Resultant force has to be zero**

Q)Planar mechanism means--> **All the members of the mechanism can be in a series of parallel planes.**

Q)For a three force member to be in equilibrium which of the following conditions has to be satisfied--> **Resultant force has to be zero**

Q)According to D'Alembert's principle, for the dynamic equilibrium of a member--> **the member may not be moving with uniform velocity**

Q)The angle of inclination of the plane, at which the body begins to move down the plane is called--> **angle of friction**

Q)A part isolated from the mechanism in equilibrium _____ be in equilibrium.--> **must be**

Q)In static equilibrium the vector sum of all forces acting on a body and all the moments about _____ point is zero.--> **any arbitrary**

Q)If the lines of action of three or more forces intersect at a point, it is known as _____.--> **concurrency**

Q)The maximum frictional force, which comes into play, when a body just begins to slide over the other body, is known as--> **limiting friction**

Q)A body will begin to move down the inclined plane, if the angle of inclination of the plane is _____ the angle of friction--> **greater than**

Q)The friction experienced by two bodies separated by thick layer of lubricant is called--> **fluid friction**

Q)The force of friction always acts in a direction of--> **opposite to the direction of motion of the body**

Q)The friction experienced by two bodies separated by a thin layer of lubricant is called--> **skin friction**

Q)The frictional torque transmitted in a flat pivot bearing, considering uniform wear, is--> **WR**

Q)The velocity of rubbing surface _____ with the distance from the axis of the bearing--> **increases**

Q)The radius of a friction circle for a shaft rotating inside a bearing is--> **$r \sin \phi$**

Q)The frictional torque transmitted in a flat collar bearing, considering uniform wear, is--> **$\frac{2}{3} W (r_1 + r_2)$**

Q)Which of the following statement holds good for multicollar thrust bearing carrying an axial thrust of W units?--> **the intensity of the pressure is not affected by the number of collars.**

Q)In a flat collar pivot bearing, the moment due to friction is proportional to--> **$((r_1^3 - r_2^3) / (r_1^2 - r_2^2))$**

Q)The frictional torque transmitted in a flat pivot bearing with assumption of uniform pressures is . As compared to uniform wear.--> **more**

- Q)The friction transmitted in a flat collar bearing, considering uniform pressure, is--> **$\frac{2}{3} W \frac{(r_1^3 - r_2^3)}{(r_1^2 - r_2^2)}$**
- Q)The frictional torque transmitted in a truncated conical pivot bearing, considering uniform pressure, is--> **$\frac{2}{3} W \operatorname{cosec} \alpha \frac{(r_1^3 - r_2^3)}{(r_1^2 - r_2^2)}$**
- Q)The frictional torque transmitted in a truncated conical pivot bearing, considering uniform wear, is--> **$W \operatorname{cosec} \alpha (r_1 + r_2)$**
- Q)The frictional torque transmitted in a conical pivot bearing with assumption of uniform pressure is .. as compared to uniform wear.--> **more**
- Q)The frictional torque transmitted in a conical pivot bearing, considering uniform pressure, is--> **$\frac{2}{3} WR \operatorname{cosec} \alpha$**
- Q)The frictional torque transmitted in a conical pivot bearing, considering uniform wear, is--> **$WR \operatorname{cosec} \alpha$**
- Q)The frictional torque transmitted by a cone clutch is same as that of--> **truncated conical pivot bearing**
- Q)Which of the following is a transmission dynamometer?--> **belt dynamometer**
- Q)In a disc clutch, if there are n_1 number of discs on the driving shaft and n_2 number of discs on the driven shaft, then the number of pairs of contact surfaces will be--> **$n_1 + n_2 - 1$**
- Q)In a railway axel boxes, the bearing used is--> **double row spherical roller bearing**
- Q)The frictional torque transmitted by a disc or plate clutch is same as that of--> **flat collar bearing**
- Q)The stopping distance for a four wheel vehicle is--> **all of the above**
- Q)The stopping distance for a vehicle by applying brakes when all the four wheels are sliding as compared to when all the four wheels are in a limiting state of sliding is--> **more**
- Q)Dynamometer is a device used on a prime mover for measuring--> **all of the above**
- Q)The flywheel influences the--> **cyclic variation in speed of the prime mover**
- Q)Which of the following is an absorption dynamometer?--> **all of the above**
- Q)The net effect of creep in belt is to--> **decrease the speed of driven pulley**
- Q)The following dynamometer is widely used for absorption of wide range of power at wide range of speed--> **hydraulic**
- Q)For maximum power to be transmitted by belt drive, the ration of centrifugal tension to effective tight side tension is--> **$\frac{1}{2}$**
- Q)The apparent coefficient of friction for V-belt is--> **$\frac{1}{\sin \beta}$**
- Q)For maximum power to be transmitted by belt drive, the ration of centrifugal tension to permissible tension is--> **$\frac{1}{3}$**
- Q)The static friction--> **all of the above**
- Q)Which of the following statement regarding laws governing the friction between dry surfaces are correct?--> **all of the above**
- Q)The dynamics friction is the friction experienced by a body, when the body--> **is in motion**
- Q)The equivalent radius of block brake is--> **$4r \sin(\theta/2) / (\sin \theta + \theta)$**
- Q)The acceleration of a piston in a reciprocating steam engine is given by _____, Where x is displacement, r is radius of crank, θ is the angle turned through from inner dead centre, n is the ratio of length of connecting rod to the radius of crank.--> **$a = r\omega^2 \left[\cos \theta + \frac{\cos 2\theta}{n} \right]$**

Q)When the crank is at the inner dead centre, in a reciprocating steam engine the velocity of piston will be--> **zero**

Q)The velocity of a piston in a reciprocating steam engine is given by _____, Where x is displacement, r is radius of crank, θ is the angle turned through from inner dead centre, n is the

ratio of length of connecting rod to the radius of crank.--> $V = r\omega \left[\sin \theta + \frac{\sin 2\theta}{2n} \right]$

Q)The inertia force is equal to accelerating force in magnitude, but opposite in direction. This is given by--> **D'Alemberts principle**

Q)The displacement of a piston in a reciprocating steam engine is given by _____, Where x is displacement, r is radius of crank, θ is the angle turned through from inner dead centre.--> **$x = r(1 - \cos \theta)$**

Q)In a reciprocating steam engine, when the crank has turned through from inner dead centre

through an angle θ , the angular acceleration of connecting rod is--> $\frac{\omega^2 \sin \theta (n^2 - 1)}{[(n^2 - \sin^2 \theta)^{3/2}]}$

Q)In a reciprocating steam engine, when the crank has turned through from inner dead centre

through an angle θ , the angular velocity of connecting rod is--> $\frac{\omega \cos \theta}{[(n^2 - \sin^2 \theta)^{1/2}]}$

Q)When the crank is at mid position, in a reciprocating steam engine the acceleration of piston is--> **minimum**

Q)When the crank is at mid position from inner dead centre, in a reciprocating steam engine the velocity is--> **maximum**

Q)When the crank is at the inner dead centre, in a reciprocating steam engine the velocity is--

--> $a = r\omega^2 \left[1 + \frac{1}{n} \right]$

Q)The essential condition of placing two masses, so that the system becomes dynamically equivalent is, where L_1 and L_2 = Distance of two masses from centre of gravity of the body and k_G = Radius of gyration of the body.--> **$L_1 L_2 = k_G^2$**

Q)The inertia force of a connecting rod in a reciprocating steam engine is given by _____, where m = mass of connecting rod, r = radius of crank, ω is angular velocity of connecting rod, θ

is the angle turned through from Inner dead centre.--> $m r \omega^2 \left[\cos \theta + \frac{\cos 2\theta}{n} \right]$

Q)A rigid body, under the action of external forces, can be replaced by two masses placed at a fixed distance apart. The two masses form an equivalent system, if--> **All the above**

Q)The Kleins diagram is useful to find--> **Acceleration of various parts**

Q)The Kleins diagram is useful when--> **The crank has uniform angular velocity**

Q)The turning moment diagram is a plot of _____, where T is the Net torque, θ is the angle turned through from Inner dead centre, β is the orientation of connecting rod with line of stroke, F = Net force on the piston, r = radius of crank--> **T vs θ**

Q)In a four stroke I.C. engine, the purpose of flywheel is to--> **store the energy in a particular cycle of operation**

Q)The maximum fluctuation of energy is the--> **difference of maximum and minimum energies**

Q)The turning moment on the crank shaft of a reciprocating IC engine is given by _____, where F = net force on piston, r = radius of crank, ω is angular velocity of connecting rod, θ is

the angle turned through from Inner dead centre.--> $F r \left\{ \sin \theta + \frac{\sin 2\theta}{2n(n^2 - \sin^2 \theta)^{1/2}} \right\}$

Q)The crank effort of a reciprocating IC engine is given by _____, where F = Net force on the piston, r = radius of crank, ω is angular velocity of connecting rod, θ is the angle turned through

$$\frac{F \sin(\theta + \beta)}{\cos \beta}$$

from Inner dead centre, β is the orientation of connecting rod with line of stroke-->

Q)In a turning moment diagram, the variations of energy above and below the mean resisting torque line is called--> **fluctuation of energy**

Q)The ratio of maximum fluctuation of energy to the workdone per cycle is called--> **coefficient of fluctuation of energy**

Q)The coefficient of fluctuation of speed is _____ of the maximum fluctuation of speed and the mean speed--> **product**

Q)In a four stroke I.C. engine, the turning moment during the exhaust stroke is--> **negative throughout**

Q)In a four stroke I.C. engine, the maximum fluctuation of energy is--> **difference between maximum and minimum energies**

Q)In a four stroke I.C. engine, the similarity between a flywheel and a governor is--> **The former maintains the speed of the engine during a cycle whereas the latter maintains over period of cycles.**

Q)In a flywheel the coefficient of fluctuation of energy K is given by _____, where e is maximum fluctuation of energy, I is the moment of inertia of the flywheel, ω is the mean speed

of the flywheel.--> $K = \frac{e}{\frac{1}{2} I \omega^2}$

Q)If the rotating mass of a rim type flywheel is distributed on another rim type flywheel whose mean radius is half the mean radius of the former, then energy stored in the latter at the same speed will be--> **one fourth the first one**

Q)A dynamically equivalent link means--> **A link which has the same motion as that of a rigid link with two point masses, subjected to same force and has same angular acceleration.**

Q)The ratio of maximum fluctuation of speed to the mean speed is called--> **coefficient of fluctuation of speed**