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Draw neat sketch of radial cam with follower and show on it (i) Base circle. (ii) Pitch point. (iii) Prime Circle. (iv) Cam profile



What are the limitations of knife edge follower?

#### Limitations of knife edge follower are:

1. Excessive wear due to small area of contact between cam & follower surfaces.

2. In this follower a considerable thrust exists between the follower and guide.

List the methods to reduce the slip in belt and pulley.

#### Methods to reduce the slip in belt and pulley:

- 1. Vertical belt drive should be avoided.
- 2. In horizontal belt drive the upper side should be kept as loose side.

# Write down the formula of length of belt for open belt drive and cross belt drive.

Formula for length of open belt drive and cross belt drive:

Open belt drive:

 $L = 2C + \pi (D_2 + D_1)/2 + (D_2 - D_1)^2/4C$ 

Cross belt drive:

 $L = 2C + \pi (D_2 + D_1)/2 + (D_2 + D_1)^2/4C$ 

Where L=length.

C=centre distance.

D1 = pitch diameter of small pulley.

D2 = pitch diameter of large pulley.

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Define law of gearing.
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Law of Gearing: The law of gearing states that the angular velocity

ratio of all gears of a meshed gear system must remain constant also the common normal at the point of contact must pass through the pitch point.

Define self-energizing and self-locking brake.

#### Self energizing & Self Locking brake

 $Rn \ge X = PL + \mu aRn$ 

Rn = Normal reaction, P = Applied force, L = lever length

 $X = Distance of block from hinge, \mu = coefficient of friction, a = distance of drum from hinge$ 

In the above equation when frictional force adds to the breaking torque. In other words, the frictional torque and braking torque are in the same direction its a self locking brake.

In the above equation when  $X < \mu a$ , P becomes negative

#### What are the limitations of shoe brake ?

#### Limitations of a shoe brake :

- 1. Heavy side thrust causes bending of the shaft.
- 2. More wear & tear as the contact surface is large.

### Define uniform wear theory and uniform pressure theory.

Uniform Wear theory:

When the product of pressure and area of the contacting surface transmitting load is taken as constant to determine the axial force & torque, it is termed as uniform wear theory as it is assumed that wear along the surface is uniform.

State effects of imbalance in machine.

#### **Effects of imbalance in machine**

- 1. Imbalance imparts vibratory motion to the frame of the machine.
- 2. Produces noise which leads to human discomfort.

3. Detrimental effects on the machine performance & structural integrity of the machine foundation.

Draw a neat sketch and explain working of beam engine.

#### Beam engine (crank and lever mechanism).

A part of the mechanism of a beam engine (also known as cranks and lever mechanism) which consists of four links is shown in Fig. In this mechanism, when the crank rotates about the fixed centre A, the lever oscillates about a fixed centre D. The end E of the lever CDE is connected to a piston rod which reciprocates due to the rotation of the crank. In other words, the purpose of this mechanism is to convert rotary motion into reciprocating motion.



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