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Explain the working of Scotch Yoke mechanism with neat sketch.

Scotch yoke mechanism. This mechanism is used for converting rotary motion into a reciprocating motion. The inversion is obtained by fixing either the link 1 or link 3. In Fig. link 1 is
fixed. In this mechanism, when the link 2 (which corresponds to crank) rotates about B as centre,
the link 4 (which corresponds to a frame) reciprocates. The fixed link 1 guides the frame

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An I.C. Engine developing 10 kW of power is to be transmitted to a machine by flat leather belt. A 0.8 m diameter pulley is fitted on engine shaft and rotates at 300 rpm. The angle of lap is 175 o and coefficient of friction in belt and pulley is 0.25. De

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Explain with neat sketch method of drawing displacement diagram for SHM of follower.

The displacement diagram is drawn as follows for SHM of follower :
1. Draw a semi-circle on the follower stroke as diameter.
2. Divide the semi-circle into any number of even equal parts (say eight).
3. Divide the angular displacements of the cam during out stroke and return stroke into the
same number of equal parts.
4. The displacement diagram is obtained by projecting the points as shown in Figure

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Compare Belt Drive and Chain Drive (four points)

PARTICULERS
BELT DRIVE

CHAIN DRIVE

Slip
Slip may occur
No slip (Positive drive)

Use
For low Velocity Ratio
For moderate Velocity Ratio

Suitability
For large centre distance

For moderate centre distance

Space requires
Large
Moderate

Lubrication
Not required
Require

Installation
cost Less
Moderate

Example

Floor Mill, Compressor,Conveyors
Bicycle, Automobile

Draw a neat sketch of crank and slotted lever quick return mechanism of shaper. Write formula of cutting ratio.

Crank and slotted Quick Return Mechanism for shaper

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Formula of cutting ratio

State the adverse effect of imbalance on rotating element of machine.

1) The dynamic forces are set up and these forces increase the loads on bearings and stresses in the various members.

2) Produce unpleasant noise and dangerous vibrations.

Draw a neat sketch of internal expanding shoe brake and lable it.

State the reason of using roller follower over kinfe edge follower.

1) Roller follower has less wear and tear than knife edge follower.
2) Power required for driving the cam is less due to less frictional force between cam and
follower.

State the necessity of Acceleration diagram of a mechanism.

1) Acceleration diagram is important in mechanism , because acceleration is directly related to

force. F = m * a
2) By calculating acceleration, we calculate inertia force acting on different links.
3) Design of machine parts rotating at higher speed becomes safe.

Define completely constrained motion and successfully constrained motion.

1)Completely constrained motion :- When the motion between a pair is limited to a definite
direction irrespective of the direction of force applied, then the motion is said to be a completely
constrained motion.
2)Successfully constrained motion:- When the motion between the elements, forming a pair, is
such that the constrained motion is not completed by itself, but by some other means, then the
motion is said to be successfully constrained motion.

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