Draw basic 'cam-follower' diagram showing its terminology (Mini four terminology).

Basic Cam Follower Profile:

Explain the construction of 'Disc brake' with neat sketch.

Modern vehicles always equipped with disc brakes on at least the front two wheels. It
consists of mainly 3 parts,
[1] Rotor
[2] Caliper
[3] Brake pads
In between each piston and disc, friction pad held in position by springs. Higher
applied forces can be used in disc brakes than in drum brakes, because the design of
the rotor is stronger than the design of the drum. Due to this, large resistance is

carried by flat disc. In this, Flat plate disc with flat friction pad are used against heavy

Name the suitable mechanism to be used for following applications: (i) Lifting water from well (ii) Connecting misaligned shafts (iii) Converting rotary motion into reciprocating motion (iv) Maintain constant relative motion between two rotary element

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APPLICATION

SUITABLE Mechanisim

i)
Lifting water from well
Pendulum pump (Bull Engine)

ii)
Connecting misaligned shaft
Oldham's coupling

iii)
Converting rotary motion into
reciprocating motion
Beam Engine (Crank & Lever Msm)

iv)

Maintain constant relative motion
between two rotary elements

Coupling rod of locomotive

Draw a neat sketch of 'Locomotive coupler' mechanism? Explain its working in brief.

Figure: Coupler Rod of Locomotive
(Link AD = Link BC = Crank Link CD = Coupling Rod Link AB = Fixed
Link = Frame)

Working of Coupler Rod of Locomotive:
It is an example of Double Crank Mechanism in which, Links AD and
BC (having equal
length) act as cranks and are connected to the respective wheels. Link
CD acts as a
coupling rod and link AB is fixed in order to maintain a Constant
center to center
distance between them. This mechanism is meant for transmitting
rotary motion
from one wheel to the other wheel.

Differentiate between belt drive and gear drive.

Difference between Belt and Gear Drive: (Any 04 Points, 01 Mark for each)

Basis

Belt Drive

Gear Drive

Power

transmitting Less

High

capacity

Slip & Creep

Material used

Type of drive

Centre distance between

the shafts

Overload taking capacity

Velocity Ratio

Use

Occurs

Flexible in nature

Slip drive

Medium or large

No

Rigid material used

Positive drive

Very less

Slips when overloaded

Damages

when

overloaded

Draw the following displacement diagram for follower: (i) S.H.M (ii) Uniform acceleration and decelaration

Displacement Diagram for Simple Harmonic Motion (SHM):

Displacement Diagram for Uniform Acceleration and Deceleration:

Explain the term: (i) Slip (ii) Creep

Slip: The forward motion of the driver without carrying the belt with it or forward
motion of the belt without carrying the driven pulley with it, is called slip of the belt.
Slip reduces velocity ratio and also power transmission capacity of the belt drive. Less
slip in the belt drive is desirable.
OR
When belt is transmitted power from driver to driven pulley, there is a loss of motion

due to insufficient frictional grip and therefore the speed of driven pulley is less than

Draw neat diagram of 'scotch yoke mechanism'? Explain its constructional features in brief.

Constructional Features of Scotch Yoke Mechanism:

[1] In this mechanism, two sliding pairs and two turning pairs are used. So it is an

inversion of Double Slider Crank Chain Mechanism.

[2] It consists of following types of links with relative motion as mentioned below;

Link 1 (B) – Fixed Link – Guide the Frame

Link 2 – Crank – Turning Motion – Rotates about Point B in Link 1

Link 3 - Slider -Sliding Motion

Link 4 – Fixed Link – Frame – Reciprocating Motion

[3] The inversion is obtained by fixing either the Link 1 or Link

Give the classification of air conditioning systems.

Air conditioning systems are classified as

1) Classification as to major function- i) Comfort air-conditioning -

air conditioning in hotels, homes, offices etc. ii) Commercial air-conditioning- air conditioning for malls, super market etc iii) Industrial air-conditioning – air conditioning for processing, laboratories etc

Define : i) DBT

i) **DBT** – Dry bulb temperature - t_{DB} - It is the temperature of air recorded by an ordinary thermometer and it is not affected by the moisture present in air.

ii) **WBT** -It is the temperature recorded by thermometer when its bulb is covered with wet cloth known as wick and is exposed to air.

iii) **DPT** – Dew point temperature t_{DP} *D.P.T. of mixture is defined as the temperature at which water vapours starts to condense.*

iv) **Relative humidity:-** It is defined as the ratio of partial pressure of water vapour in a given volume of mixture to the partial pressure of water vapour when same volume of mixture is saturated at the same temperature.

$$\therefore RH = \frac{P_v}{P_v\,sat} \times 100$$

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